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# Advance Data

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## BIRTHS 1997

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## Technical Foreword

### Changes in birth data collection affecting information in *Advance Data: Births 1997*

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In 1996, Massachusetts implemented a major revision to the birth certificate form and installed a new Electronic Birth Certificate (EBC) system in Massachusetts maternity hospitals. As a result, future years of Massachusetts natality data will afford public health researchers, program planners, the health care community, and the public with vastly expanded information that more correctly reflects their needs and the times. However, the transition to the new format affected several data elements, and not all data elements presented in this report can be compared precisely with previously published data.

As in last year's publication, *Advance Data: Births 1996*, this year's release, *Advance Data: Births 1997*, seeks to present, as closely as possible, natality data in a form that is consistent with data from 1995 and previous years. Changes reflected in last year's publication for calculating the Kessner Adequacy of Prenatal Care Index make comparison of prenatal care information for 1996 and 1997 to data prior to 1996 inappropriate. Prenatal care information for 1996 and 1997 are collected and recorded in the same manner and are comparable.<sup>1</sup> Other data items are comparable over time, but may be affected by minor changes in data collection, recording, and coding. Future issues of *Advance Data* will be presented with the new format and will use the new data elements.

Additions: Two new tables have been added to *Advance Data: Births 1997*. Table 6 provides information on multiple births in Massachusetts from 1989 to 1997. Data are presented for single births, twins, and higher order births stratified by maternal age (under the age of 35 and age 35 and older). Table 15 presents more complete data than formerly were available for methods of delivery for licensed maternity facilities in Massachusetts. Primary cesarean section delivery rates, repeat cesarean section rates, and VBACs (vaginal births after cesarean section delivery) are provided for all women giving birth in Massachusetts in 1997.

Population Data: Population data for 1996 and 1997 used in this publication are based on 1995 estimates produced by the Massachusetts Institute for Social and Economic Research (MISER) in June 1997. We have extrapolated from these data to produce population

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<sup>1</sup> Beginning in 1996, the collection of data for calculation of the Kessner Adequacy Index differed from previous years. From 1986 to 1995, data elements for use in calculating the adequacy index were as follows: Number of Prenatal Visits (NPV), adjusted by birthweight for premature infants, and Month of Pregnancy that Prenatal Care Began (MPPCB), coded as 1-9. Hospitals were required to calculate the MPPCB from data available in medical and prenatal records. Since 1996, the data elements for use in calculating the adequacy index are still NPV and MPPCB (1-9). However, currently, NPV is adjusted by the clinical estimate of gestation for premature infants rather than by birthweight. Secondly, rather than have individual hospitals make determinations of MPPCB, the new birth certificate asks hospitals to report the precise Date of First Prenatal Care Visit (DFPCV). This increases the consistency of data collection across facilities and yields a more standardized calculation of MPPCB. Rather unexpectedly, MPPCB in 1996 showed a marked decline in first trimester visits when DFPCV was used to determine the month as opposed to hospitals reporting just the month. When comparing the adequacy index for 1995 and 1996 or 1997, there is almost universal decline in state and hospital adequacy rates. This decline is unlikely to reflect a significant actual decline, but rather a data adjustment due to more accurate data collection in 1996 and 1997.

estimates for 1996 and 1997. As a result of using the updated population estimates, there may be differences from previously published data for crude and age-specific birth rates for 1991-1995. All future volumes of ***Advance Data*** will use the most recently updated population data available from MISER. Final revised population estimates for 1991-1997 are scheduled to be completed by MISER in August 1999.

We apologize for any inconvenience these changes might cause. Ultimately, we feel these modifications will greatly enhance the quality, completeness, depth, and utility of the birth certificate data and this publication.

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## **EXECUTIVE SUMMARY**



## Highlights

In 1997, 80,321 infants were born to women residing in Massachusetts, an 11% increase in the number of births since 1980, but a 13% decrease since 1990. In 1997, 76.1% of Massachusetts births were to white non-Hispanic women, 10.2% to Hispanic women, 6.8% to black non-Hispanic women and 4.8% to Asian women.

The majority of births were to women over age 30. The birth rate among teenagers (ages 15-19) increased slightly in 1997 over the previous year, while it continued to decline for women in their 20s. The fastest growing age-specific birth rates in the 1990s have been for women ages 40 and above.

The infant mortality rate (IMR) was 5.3 per 1,000 live births in 1997, representing a 6% increase from 5.0 per 1,000 in 1996. Black non-Hispanic mothers continue to have the highest IMR -- 11.7 deaths per 1,000 live births. Increases in IMRs were observed among white non-Hispanics, black non-Hispanics, Hispanics and Asians, with the most marked increase occurring among Hispanics, from 5.1 in 1996 to 6.7 in 1997; it was 7.2 in 1995. These patterns should be monitored to see whether they represent trends or merely year-to-year fluctuations.

Although it is difficult to examine trends in adequacy of prenatal care due to changes in data recorded on the birth certificate, women in some of the larger, urban communities such as Lawrence, Brockton, Springfield, Lowell and Worcester had much lower rates of adequate prenatal care services than the statewide average. (For a woman to be included in the "adequate" prenatal care category, she must have begun prenatal care during her first three months of pregnancy and have received at least nine prenatal care visits (assuming a full term delivery). Please see the Technical Foreword for more information about the changes in birth certificate data collection.)

The Cesarean section delivery rate has declined from 22.4% of live births in 1990 to 19.8% in 1997. Furthermore, 33.5% of women with a previous Cesarean section had vaginal birth after Cesarean section delivery (VBAC), up from 9% in 1987.

Many women smokers stopped smoking or decreased their daily consumption of cigarettes during pregnancy. Among women who smoked prior to becoming pregnant, 39% reportedly quit, 27% decreased the amount they smoked, 34% smoked at the same level, and fewer than 1% increased their smoking.

In 1997, Massachusetts perinatal health indicators were generally better than those for the U.S. as a whole. The IMR was 25% lower; the low birth weight (LBW) rate was 7% lower; the teen birth rate was 36% lower; and use of prenatal care in the first trimester was 2% higher than the U.S. rates.

## Birth Rates

In 1997, 56.0 births occurred for every 1,000 Massachusetts women 15-44 years old. This represents a 10% decrease since 1990. The Massachusetts birth rate was 14% below the U.S. rate of 65.3 births per 1,000 women ages 15-44.

In 1997, 33.8 live births occurred for every 1,000 women ages 15-19 years, a 5% decrease since 1990. This rate was 36% below the national teen birth rate of 52.9 per 1,000 women ages 15-19.

In 1997, the age-specific birth rates were highest for 30-34 year old and 25-29 year old mothers at 95.5 and 80.6 births per 1,000 women, respectively. The birth rates for women ages 30 years and over increased in 1997, as they have throughout the 1990s. The age groups with the largest increases in birth rates since 1990 were women ages 45-49 years (55.1%) and women ages 40-44 years (38.2%). Continuing the trend that was first observed in 1996, there were again more births to women ages 30 and over than under age 30.

### **Infant Mortality Rates**

In 1997, 425 infant deaths occurred among Massachusetts residents, an increase of 22 infant deaths from 1996. The 1997 Massachusetts infant mortality rate (IMR) was 5.3 deaths per 1,000 live births. This rate was 25% below the 1997 U.S. preliminary rate of 7.1 deaths per 1,000 live births.

Between 1980 and 1997, the infant mortality rate decreased by 49% for infants born to white women, and 43% for infants born to black women. Infants born to black non-Hispanic mothers continue to have the highest IMR, 11.7 per 1,000 live births. This represents a slight increase from the 1996 rate of 11.4 and is more than double the IMR for white non-Hispanic mothers (4.8). In 1997, the IMR for Hispanics was 6.7 per 1,000 live births, representing a 31% increase over the 1996 rate but an overall decline of 7% since 1995. Asian mothers had the lowest infant mortality rate, 2.6 per 1,000 live births, compared to the other race/ethnicity groups. (Caution should be used when interpreting this rate since it is based on a small number (10) of deaths).

Among white non-Hispanic mothers, the neonatal mortality rate (deaths to infants less than 28 days old) increased slightly, from 3.6 per 1,000 live births in 1996 to 3.7 in 1997. During this same time period, the rates increased by 29% among black non-Hispanic mothers and 49% among Hispanic mothers, (from 6.2 per 1,000 in 1996 to 8.0 per 1,000 in 1997 among black non-Hispanics, and from 3.5 to 5.2 per 1,000 among Hispanic mothers). The overall post-neonatal mortality rate, representing the number of deaths to infants between 28 and 364 days old, was slightly lower in 1997 than in 1996, 1.3 and 1.4 respectively. The most marked change was among infants of black non-Hispanic mothers, where the post-neonatal mortality rate dropped between 1996 and 1997, from 5.3 to 3.7 deaths per 1,000 live births.

Four of the 30 largest communities in Massachusetts had infant mortality rates of 10 or more deaths per 1,000 live births in 1997, compared to 2 communities in 1996 and none in 1995. In 1997, the infant mortality rates were highest in: Barnstable, 12.4 deaths per 1,000 live births (6 deaths); Lawrence, 14.5 (19 deaths); Lynn, 12.5 (17 deaths); and Springfield, 9.9 (23 deaths). Because of the relatively small number of infant deaths, year-to-year fluctuations in infant mortality rates for individual communities should be interpreted with caution. Two Massachusetts communities had more than 20 infant deaths in 1997: Boston (66 infant deaths, an IMR of 8.4 compared to 7.3 in 1996) and Springfield (23 deaths, an IMR of 9.9 compared to 8.3 in 1996).

The leading causes of infant death were conditions arising in the perinatal period (234 deaths) and congenital anomalies (86 deaths). Other causes of infant death include sudden infant death syndrome (SIDS) (30 deaths), "Other diseases of nervous system and sense organs" (10 deaths), disease of the respiratory system (9 deaths), and homicide (3 deaths). There were 10 fewer deaths from SIDS in 1997 than there were in 1996.

### **Low Birthweight and Prematurity**

In 1997, 7.0% (5,617) of infants born to Massachusetts women were low birthweight (less than 2,500 grams or 5.5 pounds). This represents an increase of 9% in the low birthweight rate compared to 1996. The rising rate was due both to an increase in the number of multiple births (which have a much higher probability of being low birthweight) and an increase in the low birthweight rate for singleton births, especially among singletons of extremely low birthweight. (Refer to Chapter 3 for more details.) The low birthweight rate in Massachusetts in 1997 was 7% below the national figure of 7.5%.

The proportion of low birthweight infants varied by mother's race and ethnicity. Black non-Hispanic women had the highest proportion of low birthweight infants: 11.3%; Hispanic mothers delivered 8.3% low birthweight infants; white non-Hispanic mothers delivered 6.4% low birthweight infants; and Asian mothers, 6.8% low birthweight infants. The Massachusetts low birthweight rate for black non-Hispanic women was lower than the 1997 U.S. preliminary rate for all black women, 13.0%.

The rate of low birthweight for Massachusetts Hispanic women (8.3%) was higher than the corresponding preliminary U.S. rate of 6.4%. This may be due to differences in the composition of the Hispanic population in Massachusetts and the nation as a whole. In Massachusetts, the Hispanic population is composed mainly of people who identify their ethnicity as Puerto Rican, Dominican, and Central American. The U.S. Hispanic population has a much greater percentage of people of Mexican and Cuban descent who have relatively low rates of low birthweight.

In 1997, 7.3% (5,833) of infants born to Massachusetts resident women were preterm (premature) infants, born before the 37th week of pregnancy. A normal gestational age infant is defined as a baby delivered between the completion of the 37th and 42nd week of pregnancy.

### **Adequacy of Prenatal Care**

In 1997, 80.1% of women received adequate prenatal care. Adequacy of prenatal care, like infant mortality, varied among racial and ethnic groups. White non-Hispanic women had the highest percentage of adequate prenatal care: 84.1%. The percentage of black non-Hispanic women receiving adequate prenatal care was 66.4%, and the percentage of Hispanic women was 66.3%. The percentage of all Asian women with adequate prenatal care was 72.2%. Cambodian women, however, had the lowest percentage of adequate prenatal care, 43.4% (Table 2).

Adequacy of prenatal care also varied among the 30 largest Massachusetts communities. Eighty-five percent or more of mothers in Arlington, Brookline, Framingham, Newton, Peabody, Plymouth, Quincy, Salem and Weymouth received adequate prenatal care. In contrast, less than 70% of mothers received adequate prenatal care in five communities: Lawrence, 58.3%; Lowell, 62.2; Springfield, 64.2%; Worcester, 65.7%; and Brockton, 66.0%.

Another measure of access to prenatal care is the percentage of women who receive prenatal care in the first trimester of their pregnancy. A higher percentage of Massachusetts women received prenatal care in the first trimester compared to the U.S. as a whole: 84.4% in Massachusetts versus 82.5% nationwide.

### **Cesarean Sections**

In 1997, Cesarean section was the method of delivery for 19.9% of the births in Massachusetts maternity care facilities regardless of the mother's state of residence (19.8% for Massachusetts resident mothers), down from 22.5% of the 1990 births. (Calculations are based on births with known method of delivery.) Facilities with low rates of Cesarean section deliveries were: Hale Hospital, 13.8%; Berkshire Medical Center, 16.0%; Lawrence General Hospital, 16.1%; Tobey Hospital, 16.2%; Cambridge Hospital, 16.5% and Melrose-Wakefield Hospital, 16.5%. There were three hospitals that had Cesarean section delivery rates of 25% or more (Falmouth Hospital, Mary Lane Hospital, and North Adams Regional Hospital). And, for the fourth consecutive year, there were no hospitals that reported Cesarean section as the method of delivery for 30% or more of its births.

In 1997, 33.5% (2,764) of women with a previous Cesarean section, had a vaginal birth after Cesarean delivery (VBAC). The rate of VBACs has increased since 1989, when it was 21.0%.

## **CHAPTER 1**

### **BIRTH CHARACTERISTICS**



## **Birth Rates and Numbers**

In 1997, 80,321 live births occurred to Massachusetts residents (Table 1). This number represents an 11% increase since 1980 but a decrease of 13% since 1990. The birth rate in 1997 was 56.0 births per 1,000 women ages 15-44. This was 14% below the U.S. birth rate of 65.3 births per 1,000 women of the same ages (National Vital Statistics Report, Vol. 47, No. 4, October 7, 1998, p. 2). In Massachusetts, the birth rate increased by 5% since 1980. However, beginning in 1990, the birth rate declined steadily until 1996. (It increased slightly -- less than 1% -- between 1996 and 1997.) For the second year in a row, there were more births to women ages 30 and above than to women under age 30 (Figure 1).

## **Distribution of Births by Race and Hispanic Ethnicity**

From 1980 to 1997, the number of Massachusetts live births to white women increased by 5%; to black women 34%; and to women of Asian and other races by 294% (Table 1). In 1997 in Massachusetts, 76.1% of births (61,143) were to white non-Hispanic mothers; 10.2% of births (8,211) were to Hispanic mothers; 6.8% of births (5,457) were to black non-Hispanic mothers; and 4.8% of births (3,876) were to Asian mothers (Table 2).

## **Teen Birth Rates**

For every 1,000 female residents of Massachusetts ages 15-19 there were nearly 34 live births, a 5% decrease from the 1990 rate of 35.4 (Table 1). From 1990 to 1997, the Massachusetts female population ages 15-19 years decreased by 17%, and the actual number of births to women ages 15-19 decreased by 21%.

A little under three percent of all infants were born to women under 18 years of age, and 7.4% were born to women under 20 years of age. The percentage of births to teenagers varied by race and ethnicity, partially reflecting differences in the percentage of teenage women within each race/ethnic group. Among mothers who designated their ethnicity as Puerto Rican, 14.0% of births were to women under 18 years of age, and 29.9% to women under 20 years of age. The percent of teen births was lowest among women of Chinese ethnicity, 1.1% (Table 2).

## **Low Birthweight**

In 1997, 7.0% (5,617) of infants born to Massachusetts women were low birthweight (less than 2,500 grams or 5.5 pounds). This represents an increase in the low birthweight rate of 9% from 1996 to 1997 (Table 1). This increase was due primarily to an increase in the number of multiple births (which have a much higher probability of being low birthweight) and an increase in the low birthweight rate for singleton births, especially among singletons of extremely low birthweight. (Refer to Chapter 3 for more details.) The low birthweight rate in Massachusetts was 7% below the national figure of 7.5%.

## **Prenatal Care**

In 1997, the percentage of women receiving adequate prenatal care was 80.1% (based upon births with known adequacy values) (Table 1). (Refer to the Glossary in the Appendix for a definition of adequate prenatal care.) The percentage of women who received adequate prenatal care varied by race and ethnicity. The groups with high rates of adequate prenatal care were: white non-Hispanics (84.1%) and women who designated their ethnicity as Chinese (81.4%). In contrast, groups with low rates of adequate prenatal care were women who designated their ethnicity as: Cambodian (43.4%); other Southeast Asian (primarily Laotian and Thai women) (51.9%); and Puerto Rican (63.2%) (Table 2).

Statewide, 84.4% of women began receiving prenatal care during the first three months of pregnancy. The highest percentage of first trimester registration occurred among white non-Hispanic women, 88.1%. Cambodian women had the lowest percentage, 50.1%.

## **Cesarean Section Deliveries**

In 1997, 19.8% of Massachusetts resident infants were delivered by Cesarean section (Table 2). This represents a 12% decline from the 1990 rate of 22.4% (data not shown). In general, black non-Hispanic women had the highest percentage of Cesarean section deliveries, at 21%. Within this group, the highest percentage of Cesarean sections occurred to "Other black non-Hispanic" women (primarily Cape Verdean women and others not specified) (23.7%). Cambodian women delivered the lowest percentage of infants by Cesarean section, 7.8% (Table 2).

## **Breastfeeding**

Nearly 68% of Massachusetts mothers reported that they were breastfeeding or planning to breastfeed their infants. This represents a 20% increase since 1990 (56.6%) (data not shown). Other Asian (primarily women who designated their ethnicity as Asian Indian, Korean, Filipino, and Japanese), South American, Central American, and Other West Indian mothers all reported breastfeeding proportions of over 80%: 87.9%, 85.3% and 81.9% and 80.8% respectively. Mothers of Cambodian and Vietnamese descent reported the lowest proportion of breastfeeding, 36.6% and 44.7.0%, respectively (Table 2).

The percentage of mothers reporting breastfeeding or planning to breastfeed their infants increases as mother's age increases. Mothers 45 years or older reported the highest percentage, 85.4%, while mothers in the youngest age group, ages 10-14, reported the lowest (45.6%) (Figure 2).

## **Tobacco Use**

In 1997, 12.2% of births were to mothers who reported smoking cigarettes during their pregnancy. This is a decline from 19.3% in 1990 (data not shown). There is substantial variation in smoking by race/ethnicity: white non-Hispanic and black non-Hispanic mothers

report the highest rates, 13.4% and 11.2% respectively. Asian mothers have the lowest smoking rate (2.1%) (Figure 3).

The majority (79.7%) of women who gave birth in 1997 were non-smokers prior to pregnancy, and 99.8% of them continued to abstain during pregnancy. (Ninety-eight women started smoking during pregnancy.) A substantial number (6,258) of women quit smoking during pregnancy, with the greatest percentage of quitting (55.1%) occurring among women who were “light” smokers (1-10 cigarettes daily) prior to pregnancy; 28.0% of women who were “moderate” smokers (11-20 cigarettes daily) prior to pregnancy quit smoking, and 17.3% of “heavy” smokers (21 or more cigarettes daily) quit smoking. Among moderate and heavy smokers, more than 70% either quit or reduced their daily number of cigarettes during pregnancy.

### **Birth Characteristics in the 30 Largest Massachusetts Cities and Towns**

In 1997, among the largest 30 communities in the Commonwealth, the crude birth rates (number of births per 1,000 population) were highest in Lawrence (18.9) and Holyoke (17.0). Crude birth rates were lowest in Chicopee (9.7) and Brookline (9.8) (Table 3A). Plymouth had the highest percentage of births to white non-Hispanic mothers, 94.7%. Communities with the highest percentage of births to black non-Hispanic women were: Boston, 32.0%; Brockton, 23.3%; Springfield, 22.9%; and Cambridge, 16.6%. In six of the 30 largest municipalities, 20% or more of 1997 births were to Hispanic women: Lawrence, 69.2%; Holyoke, 59.6%; Springfield, 36.4%; Lynn, 28.3%; Worcester, 24.0%; and Boston, 21.2%.

Six communities (Boston, Brockton, Framingham, Pittsfield, Springfield, Worcester) recorded low birthweight percentages that were 25% higher than the statewide average of 7.0%. Adequacy of prenatal care varied by community, with 85% or more of the mothers in Arlington, Brookline, Framingham, Newton, Peabody, Plymouth, Quincy, Salem and Weymouth receiving adequate prenatal care. In contrast, fewer than 70% of mothers received adequate prenatal care in five communities: Lawrence, 58.3%; Lowell, 62.2%; Springfield, 64.2%; Worcester, 65.7%; and Brockton, 66.0%. The birth rate for teens was highest in Holyoke (94.9 births per 1,000 females ages 15 to 19), more than two and a half times the statewide rate of 33.8 and more than 10% higher than Springfield (82.3/1,000) or Lawrence (81.1/1,000), the two communities with the next highest teen birth rates (Table 3A).

Three of the 30 largest communities had an infant mortality rate in excess of 10 deaths per 1,000 live births in 1997: Lawrence (14.5 deaths per 1,000 live births), Lynn (12.5) and Barnstable (12.4). Infant mortality rates should be interpreted with caution in individual communities with a small number of infant deaths (Table 3A).

### **Birth Characteristics in Community Health Network Areas**

Among the 27 Massachusetts Community Health Network Areas (CHNAs), four had crude birth rates of 15 births or more per 1,000 population: Community Partners for Health (Milford) (15.9); Greater Lawrence Community Health Network (15.7); Community Health Network of Greater Metro West (Framingham) (15.4); and Greater Lowell Community Health Network (15.3) (Table 3B). In one CHNA (Alliance for Community Health - Boston/Chelsea/Revere/Winthrop) 8.9%

of the resident births were low birthweight -- this is more than 25% higher than the statewide average of 7.0%. In seven of the CHNAs, fewer than 75% of mothers received adequate prenatal care: Community Wellness Coalition (Worcester) (68.3%); The Community Health Connection (Springfield) (71.0%); Greater Lawrence Community Health Network (71.1%); Four (For) Communities (Holyoke) (73.2%); Greater Lowell Community Health Network (74.5%); Upper Valley Health Web (Franklin County) (74.6%) and Greater Southbridge Community Health Network (74.8%) (see page 88 for a description of the CHNAs).

The teen birth rates for the CHNAs of Greater Lawrence Community Health Network, The Community Health Connection (Springfield), and Four (For) Communities (Holyoke) were the highest in the state. Two of the CHNAs had infant mortality rates more than 50% above the state rate of 5.3 deaths per 1,000 live births: Greater Lawrence Community Health Network, 9.1 (24 deaths) and North Shore Community Health Network, 8.3 (29 deaths). Because of the relatively small number of infant deaths, mortality rates in individual CHNAs should be interpreted with caution (Tables 3B and 16C).

### **Patterns in Number and Rate of Births by Age Group**

There has been a marked change in the age distribution of Massachusetts resident mothers since 1980. Approximately 25% of women giving birth were ages 30 and older in 1980 as compared to 52% in 1997. In 1997, there were more births to women ages 30 and older (42,046) than to women under age 30 (38,275) (Figure 1).

The age-specific birth rate for Massachusetts resident women ages 15-44 years decreased 10% from 1990 (62.2 per 1,000 women) to 1997 (56.0 per 1,000 women). In 1997, the age-specific birth rates were highest for 30-34 year old (95.5 per 1,000) and 25-29 year old mothers (80.6 per 1,000) (Table 4). The birth rates for women ages 30 and older have increased steadily throughout 1990s (data not shown).

The age groups with the largest increases in birth rates from 1990 were women ages 45-49 years (55.1% increase), and women ages 40-44 years (38.2% increase). In 1995, the birth rate for Massachusetts resident women ages 30-44 years surpassed the rate for women younger than age 30 for the first time in Massachusetts history (data not shown).

The Massachusetts birth rate for teenage women (ages 15-19) was 36% below the national rate (National Vital Statistics Report, Vol. 47, No. 4, October 7, 1998, p. 2). In 1997, the Massachusetts birth rate to women ages 15-19 was 33.8 births per 1,000 whereas the U.S. rate was 52.9 per 1,000 women age 15-19. In 1997, there were 103 births to mothers ages 12-14 and there were 100 births to women 45 years of age or older (Table 4). *(Please note: Massachusetts birth rates for women ages 15-19 in this publication use 1997 population extrapolations based on data released from the Massachusetts Institute for Social and Economic Research (MISER) in June, 1997. These rates may differ from teen birth rates given in previous publications which use estimates based on previous MISER data. They may also differ from rates given in federal publications which use Census population estimates).*

## **Parity**

Parity is defined as the total number of live infants ever born to a woman, including the current birth. In 1997, 43.9% of all Massachusetts women who gave birth did so for the first time. One-third (33.9%) had a second child. About 18% of births to teenage women ages 15 to 19 were a second or higher birth (Table 5).

Women ages 30-44 were most likely to be giving birth to a second child -- 38.1% of women ages 30 to 34, 36.7% of 35 to 39 year olds, and 34.5% of women ages 40 to 44 gave birth to a second child. Women ages 45 and older were most likely to be giving birth for the first time (41.0%).

## **Plurality**

Plurality represents the number of births to a woman produced in the same gestational period. In 1997, 96.1% of all births were singletons, 3.6% were twins and 0.3% were triplets or higher order multiples (Table 6). The total percentage of multiple births (twins, triplets or more) was 3.9% in 1997. This compares to 2.5% in 1989, an increase of more than 50%. The increase since 1989 in the percentage of multiple births varies by age. For women under age 35, the percentage of multiple births increased from 2.3% in 1989 to 3.3% in 1997, an increase of 43%. Among women ages 35 and older, the percentage of multiple births nearly doubled during this time period. In 1997, it was 6.4% -- up from 3.4% in 1989 -- representing an increase of 88%.

**Table 1. Trends in Birth Characteristics, Massachusetts: 1980, 1985, 1990-1997**

Characteristic		1980	1985	1990	1991	1992	1993	1994	1995	1996	1997
<b>Births<sup>1</sup></b>	<b>#<sup>2</sup></b>	72,591	81,781	92,461	88,176	87,202	84,627	83,758	81,562	80,164	80,321
	<b>Rate<sup>3</sup></b>	53.4	57.5	62.1	59.6	59.2	57.8	57.5	56.3	55.6	56.0
<b>Race of Mother</b>											
<b>White<sup>4</sup></b>	<b>#</b>	66,220	71,854	80,775	76,983	76,052	73,704	72,980	71,083	69,485	69,503
	<b>%</b>	91.2	87.9	87.4	87.3	87.2	87.1	87.1	87.2	86.7	86.5
<b>Black</b>	<b>#</b>	4,626	5,099	7,729	7,352	7,203	6,916	6,713	6,299	5,946	6,182
	<b>%</b>	6.4	6.2	8.3	8.3	8.3	8.2	8.0	7.7	7.4	7.7
<b>Asian/Other<sup>5</sup></b>	<b>#</b>	1,069	1,741	3,688	3,566	3,582	3,664	3,790	3,817	3,950	4,217
	<b>%</b>	1.5	2.1	4.0	4.0	4.1	4.3	4.5	4.7	4.9	5.3
<b>Unknown</b>	<b>#</b>	676	3,087	269	275	365	343	275	363	783	419
	<b>%</b>	0.9	3.8	0.3	0.3	0.4	0.4	0.3	0.4	1.0	0.5
<b>Teen Births (Ages 15-19)</b>	<b>#</b>	7,694	6,859	7,258	6,892	6,555	6,469	6,412	5,990	5,758	5,801
	<b>Rate<sup>6</sup></b>	28.1	28.7	35.4	34.2	33.3	33.7	34.3	33.0	32.6	33.8
<b>Births to Unmarried Mothers</b>	<b>#</b>	11,356	15,044	22,837	22,852	22,612	22,345	22,302	20,857	20,253	20,640
	<b>%</b>	15.6	18.4	24.7	25.9	25.9	26.4	26.6	25.6	25.3	25.7
<b>Low Birthweight</b>	<b>#</b>	4,413	4,751	5,388	5,199	5,137	5,202	5,335	5,174	5,105	5,617
	<b>%</b>	6.1	5.8	5.8	5.9	5.9	6.1	6.4	6.3	6.4	7.0
<b>Adequate Prenatal Care</b>	<b>%<sup>7</sup></b>	82.0	79.4	80.1	81.6	82.9	83.8	84.3	84.2	80.2	80.1
	<b>%</b>	79.6	78.6	78.8	81.2	82.7	83.6	84.1	83.6	78.0	78.6

<sup>1</sup>Births presented in all tables are resident live births unless otherwise specified.

<sup>2</sup>Differences in numbers of births from previous publications are the result of updated files.

<sup>3</sup>Rates represent the total number of births to women 15-44 per 1,000 women ages 15-44.

<sup>4</sup>On tables and graphs which include data prior to June 1986, the race classifications do not include an ethnicity component; most Hispanics are included in the race category of white.

<sup>5</sup>Other races include American Indian, Hawaiian, and others not specified.

<sup>6</sup>Rate per 1,000 females ages 15-19.

<sup>7</sup>Percentages in upper row are based on births with known scores of adequacy of prenatal care; bottom row percentages are based on total numbers of births. In subsequent tables and figures, percentage with adequate prenatal care is computed only on births with known adequacy scores

NOTE: See Technical Foreword for changes in birth data collection.

**Table 2. Birth Characteristics by Race and Ethnicity, Massachusetts, 1997**

Race and Ethnicity	Births <sup>1</sup>		Teen Births <18 Years <20 Years				Birthweight Very Low <sup>2</sup> Low <sup>3</sup>				Prenatal Care Adequate 1st Trimester				Cesarean Section		Breast Feeding <sup>4</sup>	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
<b>State Total</b>	80,321	100.0	2,208	2.7	5,904	7.4	1,098	1.4	5,617	7.0	63,134	80.1	67,035	84.4	15,853	19.8	53,231	67.9
<b>White Non-Hispanic</b>	61,143	76.1	893	1.5	2865	4.7	734	1.2	3,915	6.4	50,615	84.1	53,423	88.1	12,348	20.2	40,805	68.4
<b>Black non-Hispanic</b>	5,457	6.8	330	6.0	794	14.6	165	3.0	617	11.3	3,504	66.4	3,870	72.5	1,145	21.0	3,281	61.9
Haitian	865	1.1	14	1.6	48	5.5	28	3.2	96	11.1	565	67.1	621	73.2	202	23.4	630	74.8
Other West Indian	506	0.6	14	2.8	40	7.9	13	2.6	51	10.1	360	73.5	385	77.9	119	23.6	401	80.8
American	3,286	4.1	278	8.5	646	19.7	97	3.0	388	11.8	2,077	65.5	2,312	72.0	635	19.4	1,670	52.1
Other Black	800	1.0	24	3.0	60	7.5	27	3.4	82	10.3	502	64.8	552	70.1	189	23.7	580	76.3
<b>Hispanic</b>	8,211	10.2	796	9.7	1807	22.0	137	1.7	680	8.3	5,343	66.3	5,766	71.1	1,456	17.8	5,532	68.2
Puerto Rican	4,377	5.4	613	14.0	1309	29.9	87	2.0	399	9.1	2,722	63.2	2,965	68.6	731	16.7	2,512	57.9
Dominican	1,402	1.7	86	6.1	213	15.2	22	1.6	118	8.4	934	67.9	994	71.7	298	21.3	1,089	79.1
Central American	1,115	1.4	47	4.2	141	12.6	9	0.8	80	7.2	728	67.1	782	71.4	171	15.4	897	81.9
South American	624	0.8	11	1.8	31	5.0	3	-- <sup>5</sup>	29	4.6	463	75.5	489	79.0	145	23.2	527	85.3
Other Hispanic	693	0.9	39	5.6	113	16.3	16	2.3	54	7.8	496	73.3	536	78.8	111	16.0	507	74.3
<b>Asian<sup>6</sup></b>	3,876	4.8	106	2.7	214	5.5	29	0.7	264	6.8	2,753	72.2	2,938	76.7	590	15.3	2,627	68.4
Chinese	1,134	1.4	5	0.4	13	1.1	5	0.4	54	4.8	912	81.4	955	84.8	181	16.0	816	72.7
Vietnamese	640	0.8	16	2.5	50	7.8	5	0.8	41	6.4	409	65.7	446	71.4	91	14.2	283	44.7
Cambodian	489	0.6	57	11.7	94	19.2	4	-- <sup>5</sup>	45	9.2	208	43.4	242	50.1	38	7.8	179	36.6
Other S.E. Asian	136	0.2	13	9.6	22	16.2	0	0.0	8	5.9	70	51.9	79	58.5	15	11.0	67	49.6
Other Asian	1,477	1.8	15	1.0	35	2.4	15	1.0	116	7.9	1,154	79.1	1,216	83.1	265	18.0	1,282	87.9
<b>Other<sup>7</sup></b>	1,427	1.8	76	5.3	205	14.4	26	1.8	124	8.7	865	62.5	973	69.4	290	20.4	939	67.9
<b>Unknown<sup>8</sup></b>	207	0.3	7	3.4	19	9.2	7	3.4	17	8.2	54	65.9	65	73.9	24	15.2	47	66.2

<sup>1</sup> In the first category, "Births", percentages are based on column totals. For all other categories, percentages are based on row totals. For Prenatal Care, Cesarean Section, and Breastfeeding variables, percentages are calculated only for cases where information is known. <sup>2</sup> Very low birthweight: < 1,500 grams or 3.3 pounds. <sup>3</sup> Low birthweight: < 2,500 grams or 5.5 pounds. <sup>4</sup> Mother was breastfeeding or was intending to breastfeed at the time the birth certificate was completed. <sup>5</sup> Calculations based on fewer than five events are excluded. <sup>6</sup> Asians include Asians and Pacific Islanders. (This applies throughout the document). <sup>7</sup> Other: Mothers who designated themselves as American Indian or 'Other' race. (This applies throughout the document). <sup>8</sup> Unknown: Mothers who did not indicate a race/ethnicity.  
NOTE: See Technical Foreword for changes in birth data collection.

**Table 3A. Resident Birth Characteristics: 30 Largest Municipalities, Massachusetts: 1997 <sup>1</sup>**

Municipality	Rank	Population	Crude Birth rate <sup>2</sup>	Mother's Race and Ethnicity				Very Low Birthweight <sup>4</sup> (<1500 gms). %	Low Birthweight <sup>4</sup> (<2500 gms). %
				White Non-Hispanic %	Black Non-Hispanic %	Hispanic %	Asian or Other <sup>3</sup> %		
STATE TOTAL		6,187,181	13.0	76.1	6.8	10.2	6.6	1.4	7.0
ARLINGTON	28	41,978	14.5	86.2	2.3	2.3	9.2	-- <sup>5</sup>	5.9
BARNSTABLE	26	44,666	10.8	87.4	3.5	2.9	6.2	1.4	5.8
BOSTON	1	585,774	13.4	33.7	32.0	21.2	12.4	2.0	9.2
BROCKTON	8	90,740	15.7	49.1	23.3	10.9	16.4	2.2	9.5
BROOKLINE	16	61,362	9.8	78.0	2.8	4.2	14.7	1.2	7.3
CAMBRIDGE	5	101,360	10.0	58.6	16.6	8.1	16.7	2.4	7.9
CHICOPEE	19	56,824	9.7	79.9	3.1	15.2	1.8	1.4	6.9
FALL RIVER	7	92,503	12.0	91.0	2.5	3.0	3.4	1.6	7.9
FRAMINGHAM	14	64,407	14.8	66.0	4.5	15.4	14.1	2.3	9.8
HAVERHILL	18	57,561	14.9	86.8	1.3	10.1	1.7	1.5	7.4
HOLYOKE	30	41,636	17.0	35.6	3.2	59.6	1.6	1.0	8.1
LAWRENCE	13	69,514	18.9	24.4	1.8	69.2	4.3	2.2	8.3
LEOMINSTER	27	43,242	13.3	76.1	3.5	13.4	6.8	1.4	8.0
LOWELL	4	109,168	15.5	52.1	3.6	19.6	24.7	1.1	7.8
LYNN	11	82,207	16.5	48.0	12.8	28.3	10.3	2.0	8.4
MALDEN	20	54,388	14.4	60.2	12.0	6.5	21.2	1.4	5.4
MEDFORD	17	57,932	10.9	80.5	10.6	3.5	5.2	1.0	6.2
NEW BEDFORD	6	98,754	12.4	71.8	8.2	12.7	6.6	1.0	6.8
NEWTON	10	82,938	10.0	83.5	1.1	1.8	12.7	0.8	4.6
PEABODY	24	47,504	12.0	88.9	1.1	7.7	2.1	-- <sup>5</sup>	5.5
PITTSFIELD	25	45,871	11.7	89.0	6.2	2.6	2.2	1.5	8.8
PLYMOUTH	23	50,204	13.5	94.7	1.0	1.3	2.5	0.9	6.2
QUINCY	9	83,887	12.8	74.7	2.7	2.8	19.7	2.0	6.4
SALEM	29	41,944	11.3	75.4	2.7	18.7	3.2	1.3	8.4
SOMERVILLE	12	80,697	11.5	60.2	11.7	16.4	11.1	0.9	6.3
SPRINGFIELD	3	155,296	15.0	36.1	22.9	36.4	4.6	2.6	9.7
TAUNTON	22	53,230	14.5	91.3	2.3	4.4	1.9	-- <sup>5</sup>	5.5
WALTHAM	15	61,655	10.8	65.9	5.7	15.9	12.5	-- <sup>5</sup>	5.0
WEYMOUTH	21	53,584	14.2	93.2	2.0	2.1	2.6	1.6	8.4
WORCESTER	2	171,813	13.6	59.5	8.4	24.0	7.8	1.6	8.8

**Table 3A.(cont'd) Resident Birth Characteristics: 30 Largest Municipalities, Massachusetts: 1997**

Municipality	<u>Births</u>					<u>Deaths<sup>6</sup></u>	
	Adequate Prenatal Care <sup>4</sup> %	Public Payment for Prenatal Care %	Unmarried <sup>4</sup> %	Teen Mothers 15 to 19 years #	Rate <sup>7</sup>	Infant <1 year Rate	Neonatal < 28 days Rate
STATE TOTAL	80.1	24.4	25.7	5,801	33.8	5.3	4.0
ARLINGTON	88.2	5.4	6.1	6	8.2	-- <sup>5</sup>	-- <sup>5</sup>
BARNSTABLE	78.3	28.3	30.8	38	39.7	12.4	-- <sup>5</sup>
BOSTON	75.2	46.5	45.4	825	47.4	8.4	6.1
BROCKTON	66.0	45.1	48.9	196	71.7	4.9	3.5
BROOKLINE	89.0	6.2	5.7	6	4.9	-- <sup>5</sup>	-- <sup>5</sup>
CAMBRIDGE	83.8	17.1	20.7	54	17.6	-- <sup>5</sup>	-- <sup>5</sup>
CHICOPEE	72.5	41.8	38.9	63	37.4	-- <sup>5</sup>	-- <sup>5</sup>
FALL RIVER	74.5	44.8	43.9	141	53.5	5.4	-- <sup>5</sup>
FRAMINGHAM	85.5	18.8	20.0	61	37.6	-- <sup>5</sup>	-- <sup>5</sup>
HAVERHILL	77.8	29.8	31.5	87	61.1	8.2	7.0
HOLYOKE	70.3	68.1	61.0	180	94.9	7.1	-- <sup>5</sup>
LAWRENCE	58.3	62.4	62.0	277	81.1	14.5	12.2
LEOMINSTER	75.7	24.9	27.2	43	41.3	-- <sup>5</sup>	-- <sup>5</sup>
LOWELL	62.2	47.7	49.4	276	76.2	4.7	4.1
LYNN	75.8	53.2	47.6	182	73.8	12.5	8.1
MALDEN	81.9	23.5	22.1	33	30.0	6.4	-- <sup>5</sup>
MEDFORD	84.4	13.2	15.7	19	12.1	-- <sup>5</sup>	-- <sup>5</sup>
NEW BEDFORD	72.8	53.3	51.8	221	66.4	4.9	-- <sup>5</sup>
NEWTON	89.4	2.8	5.5	6	1.9	7.2	6.0
PEABODY	89.6	13.7	14.8	12	12.5	-- <sup>5</sup>	-- <sup>5</sup>
PITTSFIELD	74.0	34.4	35.5	58	68.0	-- <sup>5</sup>	-- <sup>5</sup>
PLYMOUTH	85.5	19.4	20.7	38	26.2	-- <sup>5</sup>	-- <sup>5</sup>
QUINCY	85.1	21.1	20.1	38	28.9	7.4	5.6
SALEM	86.5	32.6	33.9	35	33.9	-- <sup>5</sup>	-- <sup>5</sup>
SOMERVILLE	78.9	37.5	29.4	58	33.1	-- <sup>5</sup>	-- <sup>5</sup>
SPRINGFIELD	64.2	60.4	59.4	476	82.3	9.9	9.5
TAUNTON	81.9	26.6	31.3	70	51.0	-- <sup>5</sup>	-- <sup>5</sup>
WALTHAM	84.2	17.7	18.8	30	14.8	-- <sup>5</sup>	-- <sup>5</sup>
WEYMOUTH	90.7	13.2	16.9	31	32.7	-- <sup>5</sup>	-- <sup>5</sup>
WORCESTER	65.7	40.8	42.5	313	52.4	8.2	5.6

<sup>1</sup>The 30 largest municipalities are the cities and towns in Massachusetts with the largest populations according to 1997 population estimates. <sup>2</sup>Births per 1,000 residents. <sup>3</sup>Mothers who designated themselves as Asian, American Indian or Other. <sup>4</sup>Percentages are calculated only for cases where information is known. <sup>5</sup>Calculations based on fewer than 5 events are excluded. <sup>6</sup>Deaths per 1,000 live births. <sup>7</sup>Births per 1,000 female residents ages 15 to 19.

NOTE: See Technical Foreword for changes in birth data collection.

**Table 3B: Resident Birth Characteristics: Community Health Network Areas (CHNAs), Massachusetts: 1997**

CHNA	Population	Crude Birth Rate <sup>1</sup>	Mother's Race and Ethnicity				Very Low Birthweight <sup>3</sup> (<1500 gms)	Low Birthweight <sup>3</sup> (<2500 gms)
			White non- Hispanic	Black non- Hispanic	Hispani c	Asian or Other <sup>2</sup>		
			%	%	%	%	%	%
<b>STATE TOTAL</b>	6,187,181	13.0	76.1	6.8	10.2	6.6	1.4	7.0
Community Health Network of Berkshire	134,153	10.1	92.6	3.0	2.1	2.1	1.6	8.4
Upper Valley Health Web (Franklin County)	88,466	10.3	95.2	-- <sup>4</sup>	1.6	2.4	-- <sup>4</sup>	5.1
Partnership for Health in Hampshire County (Northampton)	153,823	8.6	88.3	2.0	5.4	4.1	0.8	6.6
The Community Health Connection (Springfield)	292,524	13.0	58.0	14.5	23.9	3.6	2.1	8.7
Greater Southbridge Community Health Network	114,465	12.0	91.1	-- <sup>4</sup>	7.1	1.4	0.8	6.6
Community Partners for Health (Milford)	146,125	15.9	94.9	0.7	1.9	2.4	1.2	5.9
Community Health Network of Greater Metro West (Framingham)	348,246	15.4	87.2	1.5	4.9	6.2	1.3	6.8
Community Wellness Coalition (Worcester)	281,455	13.2	72.2	5.5	15.6	6.5	1.5	8.1
Fitchburg/Gardner Community Health Network	259,873	12.0	86.2	2.0	7.7	3.8	1.3	6.9
Greater Lowell Community Health Network	267,448	15.3	76.5	1.9	8.8	12.6	0.9	7.0
Greater Lawrence Community Health Network	167,582	15.7	55.6	1.4	38.3	4.5	1.2	6.6
Greater Haverhill Community Health Network	137,760	14.2	92.5	0.9	5.1	1.5	1.2	6.5
Greater Beverly/Gloucester Community Health Network	111,242	12.4	94.9	1.1	1.7	1.8	1.2	6.6
North Shore Community Health Network	266,973	13.0	73.7	5.7	15.2	5.2	1.4	7.0
Greater Woburn/Concord/Littleton Community Health Network	195,316	13.6	87.9	1.2	2.1	8.5	1.2	5.8
North Suburban Health Alliance (Medford/Malden/Melrose)	253,424	13.7	80.1	6.5	4.7	8.5	1.5	5.7
Greater Cambridge/Somerville Community Health Network	282,079	11.4	70.4	9.3	8.3	11.9	1.3	7.0
West Suburban Health Network (Newton/Waltham)	250,696	11.6	84.4	2.1	4.8	8.4	1.0	5.3
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	731,665	13.4	38.8	26.6	21.9	12.0	1.9	8.9
Blue Hills Community Health Alliance (Quincy)	348,282	13.3	84.5	4.7	1.9	8.6	1.4	6.5
Four (For) Communities (Holyoke)	159,586	11.9	67.5	2.5	28.3	1.6	0.9	6.5
Greater Brockton Community Health Network	228,595	13.4	72.4	12.4	5.7	9.1	1.7	8.3
South Shore Community Partners in Prevention (Plymouth)	174,111	14.4	96.6	0.6	1.0	1.6	1.2	5.9
Health & Education Response (Attleboro/Taunton)	230,666	14.3	93.6	1.3	2.5	2.5	1.2	5.9
Partners for a Healthier Community (Fall River)	139,165	10.8	93.0	1.9	2.2	2.7	1.5	8.0
Greater New Bedford Community Health Network	198,615	10.9	81.4	5.0	7.5	5.6	0.9	6.1
Cape and Islands Community Health Network	224,849	10.4	91.1	2.3	2.1	4.2	1.2	5.7

**Table 3B (cont'd) Resident Birth Characteristics: Community Health Networks, Massachusetts: 1997**

CHNA	Births				Deaths <sup>5</sup>		
	Adequate Prenatal Care <sup>3</sup>	Public Payment for Prenatal Care	Unmarried <sup>3</sup>	Teen Mothers 15-19 years		Infant <1 year	Neonatal <28 days
	%	%	%	#	Rate <sup>6</sup>	Rate	Rate
<b>STATE TOTAL</b>	80.1	24.4	25.7	5,801	33.8	5.3	4.0
Community Health Network of Berkshire	77.8	30.9	31.2	120	29.4	6.7	4.4
Upper Valley Health Web (Franklin County)	74.6	30.5	30.2	82	31.2	5.5	-- <sup>4</sup>
Partnership for Health in Hampshire County (Northampton)	82.7	17.7	22.1	91	11.4	-- <sup>4</sup>	-- <sup>4</sup>
The Community Health Connection (Springfield)	71.0	44.2	43.8	556	58.5	7.6	6.8
Greater Southbridge Community Health Network	74.8	21.6	29.1	146	42.8	-- <sup>4</sup>	-- <sup>4</sup>
Community Partners for Health (Milford)	85.7	8.6	11.3	73	18.7	2.6	-- <sup>4</sup>
Community Health Network of Greater Metro West (Framingham)	87.3	8.1	10.7	158	22.4	5.6	4.5
Community Wellness Coalition (Worcester)	68.3	28.4	31.3	355	40.7	7.3	5.4
Fitchburg/Gardner Community Health Network	75.6	21.2	24.0	267	33.2	2.9	2.2
Greater Lowell Community Health Network	74.5	24.2	26.4	327	45.1	3.9	3.2
Greater Lawrence Community Health Network	71.1	36.4	37.7	333	58.6	9.1	7.2
Greater Haverhill Community Health Network	80.9	18.9	21.5	130	39.5	5.1	4.6
Greater Beverly/Gloucester Community Health Network	90.0	13.1	15.7	68	20.6	3.6	-- <sup>4</sup>
North Shore Community Health Network	84.0	29.2	27.5	242	37.6	8.3	5.5
Greater Woburn/Concord/Littleton Community Health Network	85.9	6.9	7.5	40	9.5	2.6	1.9
North Suburban Health Alliance (Medford/Malden/Melrose)	84.3	14.6	16.2	96	17.7	5.5	4.9
Greater Cambridge/Somerville Community Health Network	84.5	18.6	17.7	120	18.7	2.5	1.9
West Suburban Health Network (Newton/Waltham)	89.4	6.4	8.1	55	7.1	4.5	4.1
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	75.9	43.2	42.4	977	48.1	7.3	5.3
Blue Hills Community Health Alliance (Quincy)	88.9	12.6	14.0	132	19.1	4.8	3.7
Four (For) Communities (Holyoke)	73.2	46.5	42.8	298	54.5	5.8	3.7
Greater Brockton Community Health Network	76.4	27.2	31.0	267	39.6	4.3	3.3
South Shore Community Partners in Prevention (Plymouth)	89.4	12.6	14.8	103	21.6	6.4	5.6
Health & Education Response (Attleboro/Taunton)	83.6	16.4	20.3	171	25.7	3.9	2.7
Partners for a Healthier Community (Fall River)	78.6	35.9	37.0	166	40.6	7.3	4.6
Greater New Bedford Community Health Network	78.1	38.5	40.0	285	42.1	2.8	-- <sup>4</sup>
Cape and Islands Community Health Network	79.6	24.9	24.1	143	29.2	5.1	3.9

<sup>1</sup>Births per 1,000 residents.

<sup>2</sup>Mothers who designated themselves as Asian, American Indian or Other.

<sup>3</sup>Percentages are calculated only for cases where information is known.

<sup>4</sup>Calculations based on fewer than 5 events are excluded.

<sup>5</sup>Deaths per 1,000 live births.

<sup>6</sup>Births per 1,000 female residents ages 15 to 19.

NOTE: See Technical Foreword for changes in birth data collection.

**Table 4. Age-Specific and Crude Birth Rates, Massachusetts: 1990 and 1997**

Mother's Age	1990		1997		Percent Change in Rate
	Births <sup>1</sup>	Rate	Births	Rate	
<b>12-14</b>	124	1.3	103	0.9	-28.1
<b>15-19</b>	7,258	35.8	5,801	33.8	-5.5
<b>20-24</b>	18,115	70.5	11,653	58.3	-17.3
<b>25-29</b>	29,913	107.5	20,715	80.6	-25.0
<b>30-34</b>	25,687	92.1	26,445	95.5	3.6
<b>35-39</b>	9,795	40.1	13,155	47.4	18.3
<b>40-44</b>	1,522	6.9	2,346	9.5	38.2
<b>45+</b>	46	0.3 <sup>2</sup>	100	0.4 <sup>2</sup>	55.1
<b>Birth rate, ages 15-44<sup>3</sup></b>	92,290	62.2	80,115	56.0	-10.0
<b>Crude Birth Rate<sup>4</sup></b>	92,461	15.4	80,321	13.0	-15.4

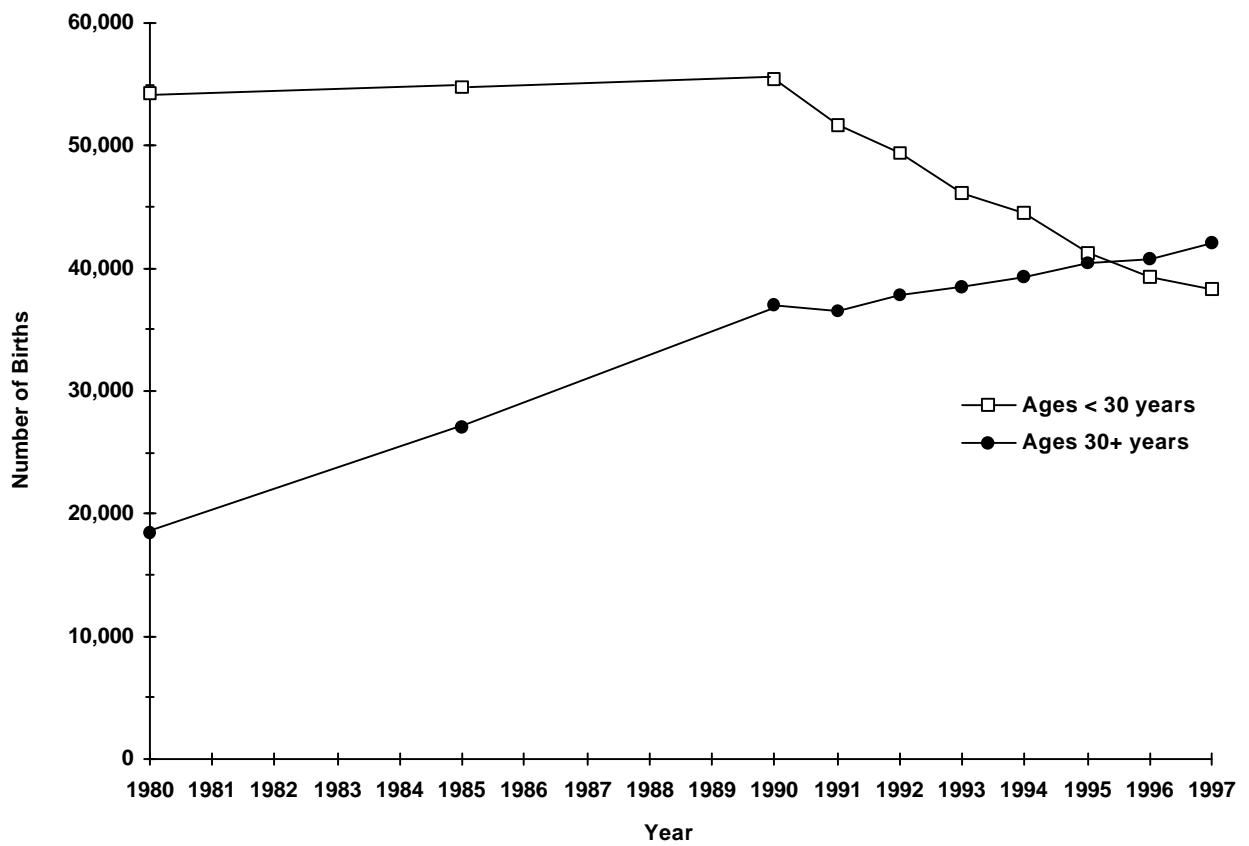
<sup>1</sup> Differences in the number of births from previous publications are the result of updating of files. The number of births for all age groups does not always add to the total number of births as mother's age is sometimes not recorded on the birth certificate.

<sup>2</sup> Denominator is female population ages 45-49.

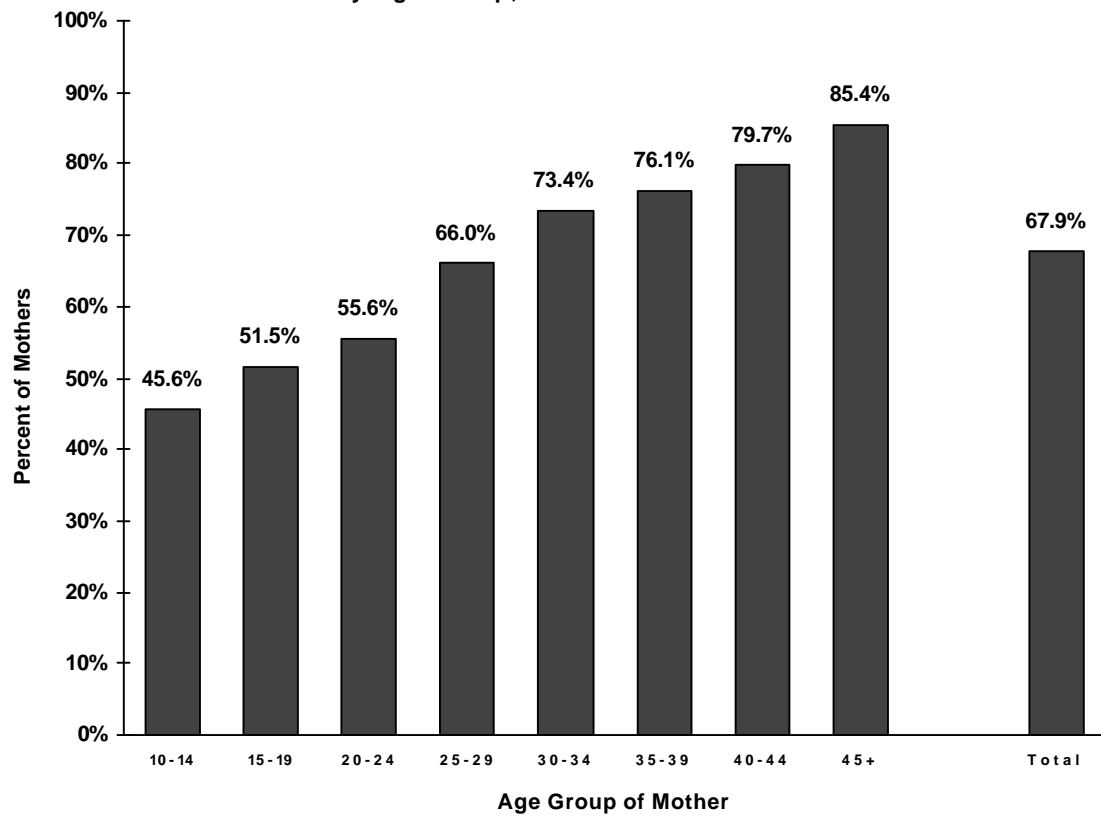
<sup>3</sup> Rate represents the total number of births to mothers ages 15-44 per 1,000 females ages 15 to 44.

<sup>4</sup> Births per 1,000 residents (females and males). Includes births to mothers of all age groups and mothers for whom age is unknown.

Figure 1. Trends in the Number of Births by Mother's Age Group,  
Massachusetts: 1980, 1985, 1990-1997



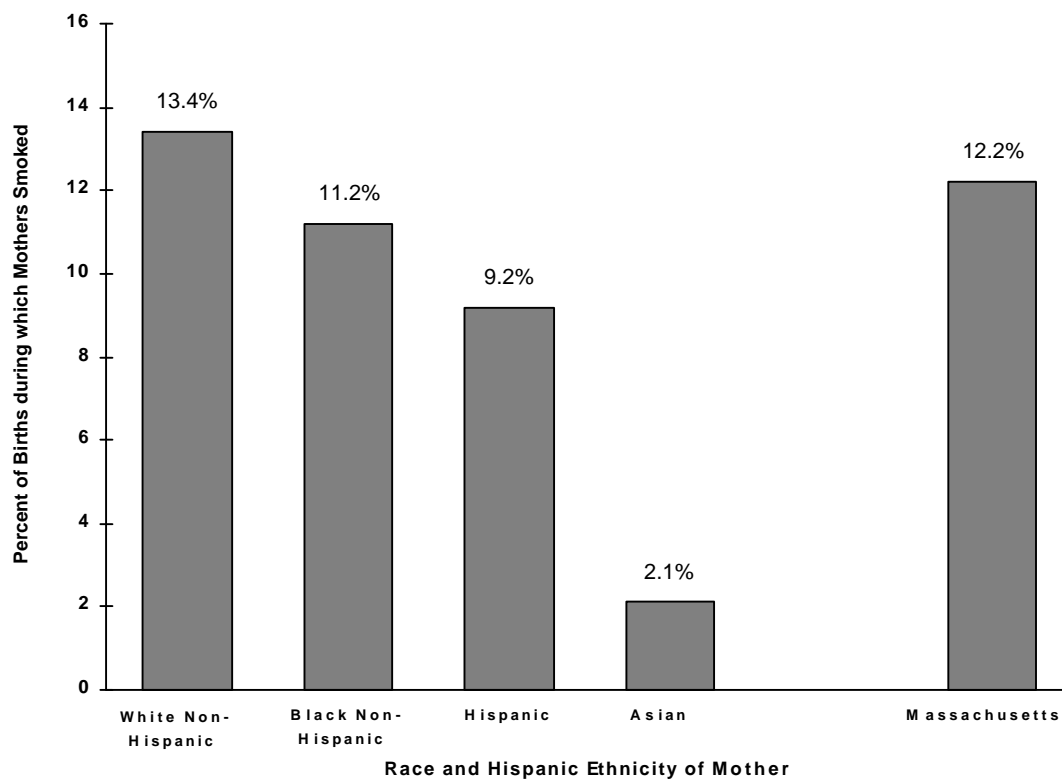
**Figure 2. Percent of Mothers Breastfeeding or Intending to Breastfeed<sup>1</sup>  
by Age Group, Massachusetts<sup>2</sup>: 1997**



<sup>1</sup> Information about breastfeeding was reported by the mother at the time the birth certificate was completed.

<sup>2</sup> For race-specific breastfeeding rates see Table 13.

**Figure 3. Smoking Prevalence<sup>1</sup> During Pregnancy, by Race and Hispanic Ethnicity of Mother, Massachusetts: 1997**



<sup>1</sup>Based on information provided on the birth certificate by mother. Mothers with more than one delivery are counted for each birth.  
NOTE: Maternal smoking is self-reported, usually following the birth of their child; these data should be interpreted cautiously.

**Figure 4. The Distribution of Smoking Status During Pregnancy Among Women Who Were Heavy, Moderate, Light or Non-Smokers<sup>1</sup> Prior to Pregnancy, Massachusetts: 1997**

**Smoking Status Prior to Pregnancy<sup>2</sup>:**

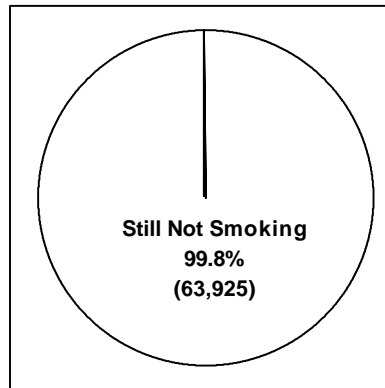
**Non-Smokers**  
79.7%  
(64,027)

**Light Smokers**  
9.0%  
(7,186)

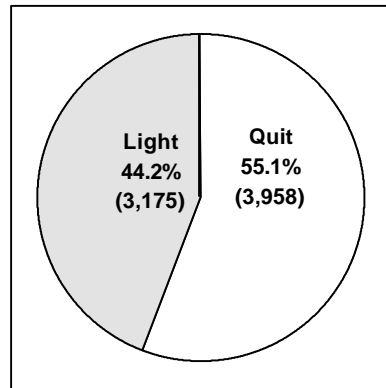
**Moderate Smokers**  
9.1%  
(7,289)

**Heavy Smokers**  
1.9%  
(1,507)

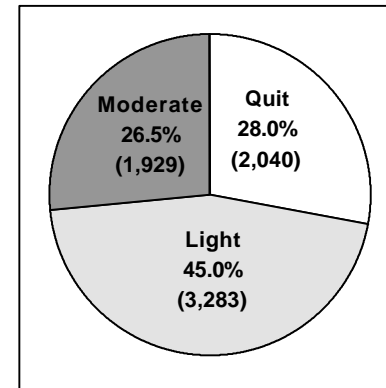
**Smoking Status During Pregnancy:**



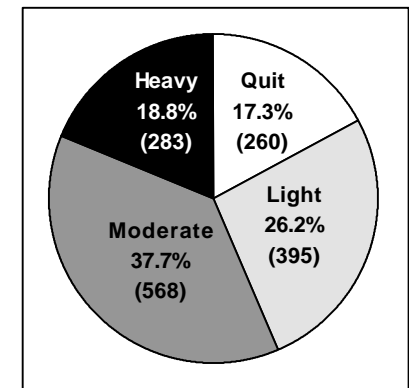
99.8% of Non-Smokers continued not smoking (0.2% started smoking)



55.1% of Light Smokers quit smoking (0.7% increased)



73.0% of Moderate Smokers decreased the number of cigarettes smoked daily or quit (0.5% increased)



81.2% of Heavy Smokers decreased the number of cigarettes smoked daily or quit

<sup>1</sup>Light Smokers=1-10 cigarettes daily; Moderate Smokers=11-20 cigarettes daily; Heavy Smokers=21 cigarettes or more daily.

<sup>2</sup>Based on mothers with known smoking status.

NOTE: Not all percentages add up to 100 due to a small number of mothers with unknown smoking status.

**Table 5. Parity by Age of Mother, Massachusetts: 1997<sup>1</sup>**

Age of Mother (years)		Total Births	1st	2nd	3rd	4th	5th+
STATE TOTAL	# <sup>2</sup>	80,321	35,298	27,255	11,815	3,931	2,022
	% <sup>3</sup>	100.0	43.9	33.9	14.7	4.9	2.5
10-14	#	103	100	3	0	0	0
	%	100.0	97.1	-- <sup>4</sup>	0.0	0.0	0.0
15-19	#	5,801	4,742	908	132	16	3
	%	100.0	81.7	15.7	2.3	0.3	-- <sup>4</sup>
20-24	#	11,653	6,185	3,760	1,239	369	100
	%	100.0	53.1	32.3	10.6	3.2	0.9
25-29	#	20,715	10,044	6,836	2,579	850	406
	%	100.0	48.5	33.0	12.4	4.1	2.0
30-34	#	26,445	9,722	10,087	4,576	1,391	669
	%	100.0	36.8	38.1	17.3	5.3	2.5
35-39	#	13,155	3,798	4,827	2,807	1,082	641
	%	100.0	28.9	36.7	21.3	8.2	4.9
40-44	#	2,346	663	810	465	216	192
	%	100.0	28.3	34.5	19.8	9.2	8.2
45+	#	100	41	24	17	7	11
	%	100.0	41.0	24.0	17.0	7.0	11.0

<sup>1</sup> The number of live births including this birth.

<sup>2</sup> Totals include births of unknown parity and unknown age.

<sup>3</sup> Percents may not sum to 100.0 due to rounding.

<sup>4</sup> Calculations based on fewer than five events are excluded.

**Table 6. Number and Percentage Distribution of Births by Plurality and Age, Massachusetts: 1989-1997<sup>1</sup>**

		Singletons				Multiples				Total births	
						<u>Twins</u>		<u>Triplets or more</u>		<u>Total Multiples</u>	
Age Group	Year	#	%	#	%	#	%	#	%	#	%
<b>All Ages</b>											
	1989	89,059	97.5	2,174	2.4	81	0.1	2,255	2.5	91,314	100.0
	1990	90,049	97.4	2,312	2.5	99	0.1	2,411	2.6	92,460	100.0
	1991	85,802	97.3	2,285	2.6	89	0.1	2,374	2.7	88,176	100.0
	1992	84,722	97.2	2,347	2.7	133	0.2	2,480	2.8	87,202	100.0
	1993	82,055	97.0	2,367	2.8	205	0.2	2,572	3.0	84,627	100.0
	1994	81,187	96.9	2,357	2.8	214	0.3	2,571	3.1	83,758	100.0
	1995	78,935	96.8	2,429	3.0	198	0.2	2,627	3.2	81,562	100.0
	1996	77,355	96.5	2,621	3.3	194	0.2	2,815	3.5	80,170	100.0
	1997	77,203	96.1	2,856	3.6	262	0.3	3,118	3.9	80,321	100.0
<b>Ages &lt;35</b>											
	1989	79,012	97.6	1,835	2.3	66	0.1	1,901	2.3	80,913	100.0
	1990	79,081	97.5	1,946	2.4	70	0.1	2,016	2.5	81,097	100.0
	1991	74,810	97.5	1,863	2.4	76	0.1	1,939	2.5	76,749	100.0
	1992	73,043	97.3	1,914	2.6	103	0.1	2,017	2.7	75,060	100.0
	1993	70,042	97.2	1,849	2.6	158	0.2	2,007	2.8	72,049	100.0
	1994	68,644	97.2	1,844	2.6	164	0.2	2,008	2.8	70,652	100.0
	1995	65,669	97.2	1,787	2.6	141	0.2	1,928	2.9	67,597	100.0
	1996	63,560	96.9	1,935	2.9	126	0.2	2,061	3.1	65,621	100.0
	1997	62,598	96.7	1,949	3.0	170	0.3	2,119	3.3	64,717	100.0
<b>Ages 35+</b>											
	1989	10,043	96.6	338	3.3	15	0.1	353	3.4	10,396	100.0
	1990	10,968	96.5	366	3.2	29	0.3	395	3.5	11,363	100.0
	1991	10,987	96.2	422	3.7	13	0.1	435	3.8	11,422	100.0
	1992	11,675	96.2	433	3.6	30	0.3	463	3.8	12,138	100.0
	1993	12,007	95.5	518	4.1	47	0.4	565	4.5	12,572	100.0
	1994	12,543	95.7	513	3.9	50	0.4	563	4.3	13,106	100.0
	1995	13,264	95.0	642	4.6	57	0.4	699	5.0	13,963	100.0
	1996	13,793	94.8	686	4.7	68	0.5	754	5.2	14,547	100.0
	1997	14,602	93.6	907	5.8	92	0.6	999	6.4	15,601	100.0

<sup>1</sup> Differences in the number of births from previous publications are the result of updating of files.

## **CHAPTER 2**

### **INFANT MORTALITY**



## **Overall Changes in Infant Mortality Rate**

In 1997, there were 425 infant deaths (children less than one year of age) among Massachusetts residents, 22 more than the number of infant deaths in 1996. The infant mortality rate (IMR) in 1997 was 5.3 deaths per 1,000 live births, a 6% increase from the 1996 rate but a 24% decrease since 1990 (Table 7A). The 1997 Massachusetts IMR of 5.3 deaths per 1,000 live births is 25% below the 1997 U.S. preliminary rate of 7.1 (National Vital Statistics Report, Vol. 47, No. 4, October 7, 1998, p. 28).

## **Race and Ethnicity Patterns in Infant Mortality Rates**

The IMR for whites was 5.0 deaths per 1,000 live births in 1997, a 6% increase from the 1996 rate (Table 7A). The IMR for black infants was 10.6 deaths per 1,000 live births, a 2% decrease from the previous year (10.8 in 1996). Since 1980, there has been a substantial decline in IMRs among black and white infants. From 1980 to 1997, the IMR decreased by 43% for black infants (a decrease from 18.6 to 10.6) and by 49% among white infants, (from 9.8 to 5.0). The decline among white infants was 14% higher than the decline among black infants. The IMR for black infants was consistently more than twice as high as the IMR for white infants during this time period. The 1997 IMR for all 'other' races (including Asian and American Indian) was 2.4, although caution should be used in interpreting these results since they are based on a very small number (10) of infant deaths.

The Massachusetts death certificate was revised in 1989 to include an Hispanic identifier. This revision enables the calculation of white non-Hispanic, black non-Hispanic, and Hispanic infant mortality rates for 1989 through 1997 (Table 7B).

Infants born to black non-Hispanic mothers continue to have the highest IMRs (11.7 per 1,000 live births). This represents a slight increase from the 1996 rate, and it is nearly three times higher than the IMR for white non-Hispanic infants.

In 1997, the IMR for Hispanics was 6.7 per 1,000 live births, representing a 31% increase from the 1996 rate, but a 7% decline from the 1995 rate. The mortality experience of infants born to Hispanic mothers is more similar to the experience of infants born to white non-Hispanic mothers than to black non-Hispanic mothers. The 1997 IMR of 6.7 for Hispanic infants is 40% higher than the white non-Hispanic rate and 43% below the black non-Hispanic rate.

Asian mothers had the lowest rates of infant mortality compared to the other race/ethnicity groups. This is consistent with prior years with the exception of 1995. In 1997, the Asian IMR was 2.7 deaths per 1,000 live births. (Caution should be used when interpreting this rate since it is based on a small number (10) of deaths.)

## **Neonatal and post neonatal mortality rates**

The overall neonatal mortality rate (deaths among infants less than 28 days old) was 4.0 per 1,000 live births in 1997, an 11% increase from 1996 (Table 7B). Among white non-Hispanic mothers, the neonatal mortality rate held steady, at 3.6 in 1996 and 3.7 per 1,000 live births in 1997. During this same time period, the rates increased by 29% among black non-Hispanic mothers (from 6.2 in 1996 to 8.0 in 1997) and increased by 49% among Hispanic mothers (from 3.5 in 1996 to 5.2 in 1997). Among Asians, there were 7 neonatal deaths in 1997, compared to 5 in 1996. (These rates should be interpreted cautiously since they are based on very few deaths.)

The overall post neonatal mortality rate, representing the number of deaths to infants between 28 and 364 days old per 1,000 live births, was 1.4 in 1997 and 1.3 in 1996. The post neonatal mortality rate among infants of white non-Hispanic mothers was the same in 1997 as 1996, 1.1 deaths per 1,000 live births. During the same period, the rates decreased by 30% among infants of black non-Hispanic mothers (from 5.3 in 1996 to 3.7 in 1997), and decreased slightly among infants of Hispanic mothers (from 1.7 in 1996 to 1.5 in 1997). The number of post neonatal deaths among Asians remained the same in 1997 as 1996 (3 deaths).

## **Causes of Infant Death**

“Certain conditions originating in the perinatal period” was the leading cause of death for white, black and Hispanic infants. Congenital anomalies represented the second leading cause of death among white and Hispanic infants, whereas “All Other Causes” was the second and “Symptoms, signs and ill-defined conditions” (primarily sudden infant death syndrome (SIDS)) was the third leading cause of death for black infants (Table 8A).

The overall leading causes of infant death were conditions arising in the perinatal period (234 deaths) and congenital anomalies (86 deaths), 7% and 18% increases from the 1996 respectively (Table 8B). Other causes of infant death include SIDS (30 deaths), “Other diseases of nervous system and sense organs” (10 deaths), disease of the respiratory system (9 deaths), and homicide (3 deaths). There were 10 fewer deaths from SIDS in 1997 than there were in 1996, representing a 25% decrease. The number of homicide deaths (3) has remained constant since 1994. (Pre-1997 data not shown).

SIDS remains the leading cause of death in the post neonatal period (28-364 days), while “disorders relating to short gestation and low birthweight” was the leading cause in the neonatal period.

**Table 7A. Trends in Infant, Neonatal, and Post-Neonatal Mortality, by Race<sup>1</sup>, Massachusetts: 1980-1997**

INFANT MORTALITY								
Year	State Total <sup>2</sup>		White		Black		Asian/Other <sup>3</sup>	
	#	Rate <sup>4</sup>	#	Rate <sup>4</sup>	#	Rate <sup>4</sup>	#	Rate <sup>4</sup>
1980	748	10.3	655	9.8	87	18.6	5	4.6
1981	710	9.6	616	9.1	85	18.2	8	6.1
1982	764	10.1	656	9.4	102	21.3	5	3.3
1983	682	9.0	579	8.3	89	19.0	12	7.4
1984	699	8.9	601	8.4	82	16.4	13	7.5
1985	745	9.1	608	8.1	126	23.8	11	6.1
1986	695	8.4	560	7.5	123	22.0	11	4.6
1987	608	7.2	486	6.4	110	17.5	12	4.5
1988	693	7.9	546	7.0	133	19.5	13	3.8
1989	697	7.6	549	6.8	131	17.7	17	4.8
1990	649	7.0	519	6.4	106	13.7	24	6.5
1991	577	6.5	461	6.0	102	13.8	14	3.9
1992	569	6.5	438	5.7	114	15.8	17	4.7
1993	523	6.2	423	5.7	87	12.5	13	3.5
1994	499	6.0	407	5.6	81	12.0	11	2.9
1995	419	5.1	333	4.7	65	10.3	21	5.5
1996	403	5.0	329	4.7	65	10.8	8	2.0
1997	425	5.3	349	5.0	66	10.6	10	2.4
NEONATAL MORTALITY								
Year	State Total <sup>2</sup>		White		Black		Asian/Other <sup>3</sup>	
	#	Rate <sup>4</sup>	#	Rate <sup>4</sup>	#	Rate <sup>4</sup>	#	Rate <sup>4</sup>
1980	550	7.6	483	7.2	62	13.3	5	4.6
1981	510	6.9	442	6.5	59	12.4	5	3.8
1982	573	7.6	494	7.1	75	15.7	3	-- <sup>5</sup>
1983	482	6.3	411	5.9	63	13.4	7	4.3
1984	472	6.0	411	5.8	49	9.8	8	4.6
1985	538	6.6	447	6.0	85	16.0	5	2.8
1986	478	5.8	383	5.2	89	15.9	5	2.1
1987	432	5.1	343	4.6	80	12.7	9	3.4
1988	477	5.4	383	4.9	87	12.8	6	1.8
1989	479	5.2	376	4.7	95	12.8	8	2.3
1990	446	4.8	347	4.3	80	10.3	9	5.1
1991	401	4.5	319	4.1	72	9.8	10	2.8
1992	415	4.8	325	4.3	79	10.9	11	3.1
1993	375	4.4	300	4.1	66	9.5	9	2.4
1994	349	4.2	280	3.8	60	8.9	9	2.4
1995	298	3.6	237	3.3	50	7.9	11	2.9
1996	290	3.6	249	3.5	35	5.8	5	1.2
1997	323	4.0	271	3.9	45	7.2	7	1.7

**Table 7A (cont'd). Trends in Infant, Neonatal, and Post-Neonatal Mortality, by Race<sup>1</sup>, Massachusetts: 1980-1997**

POST-NEONATAL MORTALITY								
Year	State Total <sup>2</sup>		White		Black		Asian/Other <sup>3</sup>	
	#	Rate <sup>4</sup>	#	Rate <sup>4</sup>	#	Rate <sup>4</sup>	#	Rate <sup>4</sup>
1980	198	2.7	172	2.6	25	5.3	0	0.0
1981	200	2.7	174	2.6	26	5.8	3	-- <sup>5</sup>
1982	191	2.5	162	2.3	27	5.6	2	-- <sup>5</sup>
1983	200	2.7	168	2.4	26	5.6	5	3.1
1984	227	2.9	190	2.6	33	6.6	5	2.9
1985	207	2.5	161	2.1	41	7.8	6	3.3
1986	217	2.6	177	2.3	34	6.1	6	2.5
1987	176	2.1	143	1.8	30	4.8	3	-- <sup>5</sup>
1988	216	2.5	163	2.1	46	6.7	7	2.0
1989	218	2.4	173	2.1	36	4.9	9	2.5
1990	203	2.2	172	2.1	26	3.4	5	1.4
1991	176	2.0	142	1.8	30	4.1	4	-- <sup>5</sup>
1992	154	1.8	113	1.5	35	4.8	6	1.7
1993	148	1.7	123	1.7	21	3.0	4	-- <sup>5</sup>
1994	150	1.8	127	1.7	21	3.1	2	-- <sup>5</sup>
1995	121	1.5	96	1.3	15	2.4	10	2.6
1996	113	1.4	80	1.1	30	5.0	3	-- <sup>5</sup>
1997	102	1.3	78	1.1	21	3.4	3	-- <sup>5</sup>

<sup>1</sup> Hispanic origin could not be identified from the Massachusetts death certificate before 1989; thus, Hispanic trend data are not available. Most Hispanics are included in the race category of white. Hispanic infant mortality data for the years 1989 through 1997 are presented in Table 7B.

<sup>2</sup> Deaths of infants of unknown race are included in the total calculation. For rate computations, infants of unknown race are allocated into the race categories according to the distribution of births of known race.

<sup>3</sup> Other: American Indian and Other races.

<sup>4</sup> Rates are expressed per 1,000 live births.

<sup>5</sup> Calculations based on fewer than five events are excluded.

**Table 7B. Trends in Infant, Neonatal, and Post-Neonatal Mortality, by Race and Hispanic Ethnicity, Massachusetts: 1989-1997**

INFANT MORTALITY												
	State Total <sup>1</sup>		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other <sup>2</sup>	
Year	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>
1989	697	7.6	482	6.6	126	18.8	67	8.6	15	4.6	7	8.1
1990	649	7.0	442	6.1	98	13.7	77	9.1	24	7.0	8	9.5
1991	577	6.5	381	5.5	101	15.0	80	9.4	14	4.2	1	-- <sup>4</sup>
1992	569	6.5	371	5.5	110	16.4	67	7.9	16	4.9	5	5.1
1993	523	6.2	346	5.3	84	13.1	77	9.3	13	3.9	3	-- <sup>4</sup>
1994	499	6.0	343	5.3	79	12.6	64	7.6	8	2.4	5	5.3
1995	419	5.1	275	4.4	65	11.1	58	7.2	19	5.5	2	-- <sup>4</sup>
1996	403	5.0	289	4.7	63	11.4	40	5.1	8	2.2	2	-- <sup>4</sup>
1997	425	5.3	294	4.8	64	11.7	55	6.7	10	2.6	2	-- <sup>4</sup>
NEONATAL MORTALITY												
	State Total <sup>1</sup>		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other <sup>2</sup>	
Year	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>
1989	479	5.2	327	4.5	93	13.9	49	6.3	6	1.8	4	-- <sup>4</sup>
1990	446	4.8	298	4.1	75	10.5	49	5.8	19	5.5	5	5.5
1991	401	4.5	266	3.9	72	10.7	53	6.2	10	3.0	0	0.0
1992	415	4.8	274	4.0	76	11.4	51	6.0	10	3.0	4	-- <sup>4</sup>
1993	375	4.4	245	3.7	64	10.0	55	6.7	9	2.7	2	-- <sup>4</sup>
1994	349	4.2	240	3.7	58	9.3	40	4.7	7	2.1	4	-- <sup>4</sup>
1995	298	3.6	198	3.1	50	8.5	39	4.8	10	2.9	1	-- <sup>4</sup>
1996	290	3.6	222	3.6	34	6.2	27	3.5	5	1.4	1	-- <sup>4</sup>
1997	323	4.0	228	3.7	44	8.0	43	5.2	7	1.8	1	-- <sup>4</sup>
POST-NEONATAL MORTALITY												
	State Total <sup>1</sup>		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other <sup>2</sup>	
Year	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>	#	Rate <sup>3</sup>
1989	218	2.4	155	2.1	33	4.9	18	2.3	9	2.8	3	-- <sup>4</sup>
1990	203	2.2	144	2.0	23	3.2	28	3.3	5	1.5	3	-- <sup>4</sup>
1991	176	2.0	115	1.7	29	4.3	27	3.2	4	-- <sup>6</sup>	1	-- <sup>4</sup>
1992	154	1.8	97	1.4	34	5.1	16	1.9	6	1.8	1	-- <sup>4</sup>
1993	148	1.7	101	1.5	20	3.1	22	2.7	4	-- <sup>6</sup>	1	-- <sup>4</sup>
1994	150	1.8	103	1.6	21	3.3	24	2.8	1	-- <sup>6</sup>	1	-- <sup>4</sup>
1995	121	1.5	77	1.2	15	2.6	19	2.3	9	2.6	1	-- <sup>4</sup>
1996	113	1.4	67	1.1	29	5.3	13	1.7	3	-- <sup>6</sup>	1	-- <sup>4</sup>
1997	102	1.3	66	1.1	20	3.7	12	1.5	3	-- <sup>6</sup>	1	-- <sup>4</sup>

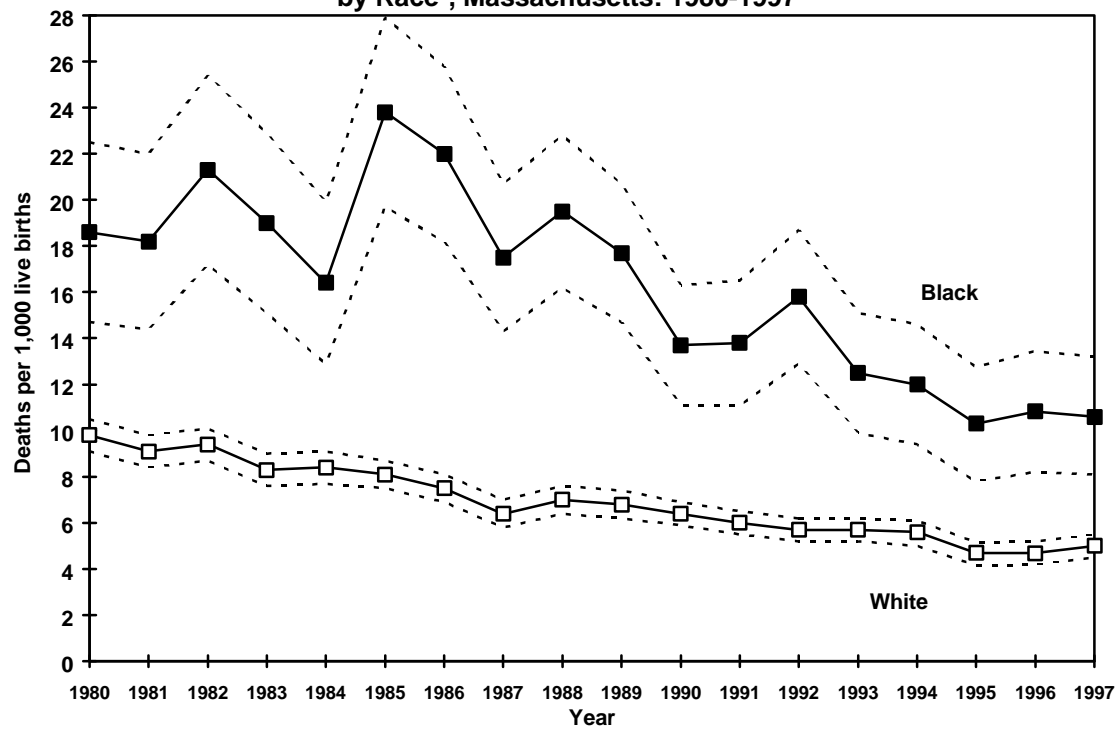
<sup>1</sup> Deaths of infants of unknown race are included in the total calculation. For rate computations, births of infants of unknown race are allocated into the race categories according to the distribution of births of known race.

<sup>2</sup> Other: American Indian and Other races.

<sup>3</sup> Rates are expressed per 1,000 live births.

<sup>4</sup> Calculations based on fewer than five events are excluded.

**Figure 5. Infant Mortality Rates and 95% Confidence Intervals<sup>1</sup>  
by Race<sup>2</sup>, Massachusetts: 1980-1997**

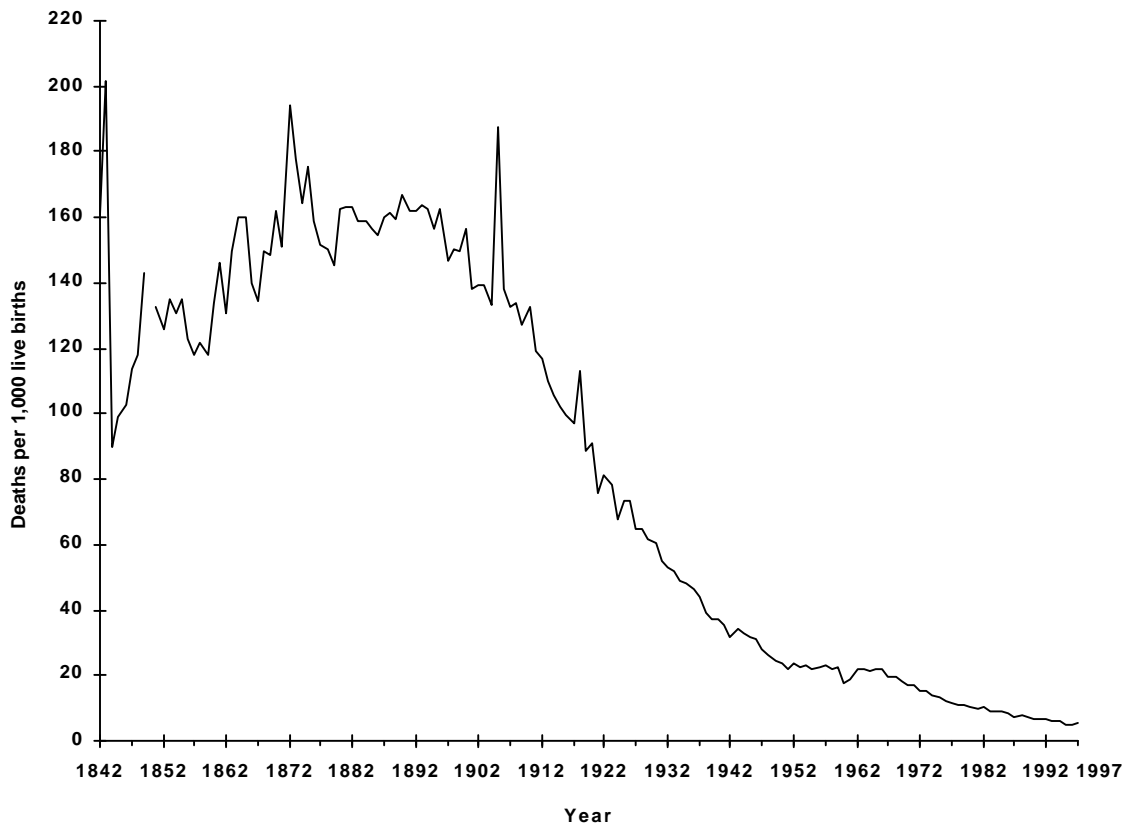


<sup>1</sup>See Appendix for explanation

<sup>2</sup>For rate computations, infant births of unknown race are allocated into race categories according to the distribution of the births of known race.

<sup>3</sup>On tables and graphs which include data prior to June 1986, the race classifications do not include ethnicity; most Hispanics are included

Figure 6. Infant Mortality Rates, Massachusetts: 1842-1997<sup>1</sup>



<sup>1</sup>Data not available for 1850.

**Table 8A. Infant Deaths by Major Causes, Race and Hispanic Ethnicity,  
Massachusetts: 1997**

Cause of Death	ICD-9 Code	White		Black		Hispanic <sup>1</sup>	
		#	%	#	%	#	%
<b>TOTAL</b>		349	100	66	100	55	100
Congenital anomalies	740-759	73	20.9	11	16.7	10	18.2
Certain conditions originating	760-779	199	57.0	30	45.5	35	63.6
Symptoms, signs, and ill-defined conditions	780-799	28	8.0	10	15.2	5	9.1
Accidents and adverse effects	E800-E949	2	-- <sup>2</sup>	0	0.0	1	-- <sup>2</sup>
Homicide	E960-E969	3	-- <sup>2</sup>	0	0.0	0	0.0
All other causes	Residual	44	12.6	15	22.7	4	-- <sup>2</sup>

<sup>1</sup>Persons of Hispanic ethnicity are also included in the race categories, consistent with the US Census population classification.

<sup>2</sup>Calculations based on fewer than five events are excluded.

**Table 8B. Infant, Neonatal, and Post Neonatal Deaths by Cause<sup>1</sup>, Massachusetts: 1997**

Cause of Death	ICD-9 Code	Infant (<1 year)		Neonatal (<28 days)		Post Neonatal (28-364 days)	
		#	% <sup>2,3</sup>	#	%	#	%
<b>TOTAL</b>		<b>425</b>	<b>100%</b>	<b>323</b>	<b>100%</b>	<b>102</b>	<b>100%</b>
Infectious and parasitic diseases	001-139	6	1.4	2	--	4	--
Cancer	140-208	2	--	0	0	2	--
Diseases of the blood and blood forming organs	280-289	0	0.0	0	0.0	0	0.0
Other diseases of nervous system and sense organs	323-389	10	2.4	1	--	9	8.8
Diseases of the respiratory system	460-519	9	2.1	3	--	6	5.9
Diseases of digestive system	520-579	4	--	1	--	3	--
<b>Congenital anomalies</b>	<b>740-759</b>	<b>86</b>	<b>20.3</b>	<b>64</b>	<b>19.8</b>	<b>22</b>	<b>21.6</b>
Anencephalus and similar anomalies	740	2	--	3	--	0	--
Congenital anomalies of central nervous system and eye	742-743	7	--	4	--	3	--
Congenital anomalies of heart	745-746	26	--	15	--	11	--
Other congenital anomalies of circulatory system	747	7	--	7	--	0	--
Congenital anomalies of respiratory system	748	14	--	14	--	0	--
Cleft palate and other digestive tract anomalies	749-751	2	--	1	--	1	--
Congenital anomalies of genitourinary system	752-753	1	--	1	--	0	--
Congenital anomalies of musculoskeletal system	754-756	8	--	6	--	2	--
Chromosomal anomalies	758	13	--	10	--	3	--
<b>Certain conditions originating in the perinatal period</b>	<b>760-779</b>	<b>234</b>	<b>55.1</b>	<b>228</b>	<b>70.6</b>	<b>6</b>	<b>5.9</b>
Newborn affected by maternal conditions which may be unrelated to present pregnancy	760	9	--	9	--	0	--
Newborn affected by maternal complications of pregnancy	761	34	--	34	--	0	--
Newborn affected by complications of placenta, cord and membrane	762	24	--	24	--	0	--
Newborn affected by other complications of labor and delivery	763	1	--	1	--	0	--
Slow fetal growth and fetal malnutrition	764	1	--	1	--	0	--
Disorders relating to short gestation and unspecified low birthweight	765	69	--	68	--	1	--
Birth trauma	767	7	--	7	--	0	--
Intrauterine hypoxia and birth asphyxia	768	5	--	5	--	0	--
Respiratory distress syndrome	769	23	--	22	--	1	--
Other respiratory conditions of newborn	770	37	--	35	--	2	--
Infections specific to the perinatal period	771	7	--	6	--	1	--
Neonatal hemorrhage	772	3	--	3	--	0	--
Other and ill-defined conditions originating in the perinatal period	775-779	14	--	13	--	1	--
<b>Symptoms, signs, and ill-defined conditions</b>	<b>780-799</b>	<b>40</b>	<b>9.4</b>	<b>7</b>	<b>2.2</b>	<b>33</b>	<b>32.4</b>
Sudden Infant Death Syndrome (SIDS)	798.0	30	--	3	--	27	--
<b>Accidents and adverse effects</b>	<b>E800-E949</b>	<b>3</b>	<b>--</b>	<b>0</b>	<b>0.0</b>	<b>3</b>	<b>--</b>
Homicide	E960-E969	3	--	0	0.0	3	--
<b>All other causes</b>	<b>Residual</b>	<b>28</b>	<b>6.6</b>	<b>17</b>	<b>5.3</b>	<b>11</b>	<b>10.8</b>

<sup>1</sup>The ICD-9 cause categories presented in this table were updated starting with Advanced Data Births: 1994. Refer to the Technical Notes in the Appendix for an explanation.

<sup>2</sup>Percents not calculated for subcategories.

<sup>3</sup>Calculations based on fewer than five events are excluded.



## **CHAPTER 3**

# **BIRTHWEIGHT AND GESTATIONAL AGE**



## **Overall Birthweight Distribution**

In 1997, 7.0% (5,617) of infants were low birthweight (less than 2,500 grams or 5.5 pounds), and 12.0% were 4,000 grams (8.8 pounds) or more (Table 9). The low birthweight rate in Massachusetts was 7% below the national preliminary figure of 7.5% (National Vital Statistics Report, Vol. 47, No. 4, October 7, 1998, p.3). The low birthweight rate in Massachusetts increased 9% from 1996 to 1997 (data not shown). This increase was due primarily to two factors; first, an increase in the number of multiple births which have a much higher probability of being low birthweight; and second, an increase in the low birthweight rate for singleton births from 4.8% in 1996 to 5.1% in 1997. The increase in low birthweight among singletons may be in part due to more complete reporting of extremely low birthweight live births. (Massachusetts Department of Public Health communications with hospitals regarding fetal deaths and the definition of live birth may have yielded the reporting of more extremely immature and/or low birthweight infants as required. This is further detailed below.)

## **Very Low Birthweight**

In 1997, 1.4% (1,098) of infants born to Massachusetts resident women were very low birthweight (less than 1,500 grams or 3.3 pounds) (Table 9). This represents an increase of 17% in the rate of very low birthweight births from 1996 (1.2%) (data not shown). The largest increases in the number and rates were in the lowest birthweight categories: there was a 26% increase in the number of live births weighing less than 500 grams (1.1 lb.); and a 17% increase in the number of infants weighing 500-999 grams (data not shown).

## **Patterns of Birthweight by Race and Ethnicity**

The proportion of low birthweight infants varied by mother's race and ethnicity. Black non-Hispanic women had the highest proportion of low birthweight infants (11.3%); Hispanic mothers delivered 8.3% low birthweight infants; Asian mothers, 6.8% low birthweight infants; and white non-Hispanic mothers delivered 6.4% low birthweight infants. The proportion of low birth deliveries declined slightly for black non-Hispanic women from 1996 to 1997, while rising for all other race/Hispanic ethnicity groups (data not shown).

The proportion of very low birthweight infants also varied by mother's race and ethnicity. Black non-Hispanic women had the highest proportion of very low birthweight infants: 3.0%; Other ethnicity groups delivered 1.8% very low birthweight infants; Hispanic mothers delivered 1.7% very low birthweight infants; white non-Hispanic, 1.2%; and Asian mothers, 0.7%.

White non-Hispanic mothers delivered the highest proportion of high birthweight infants, with 13.5% weighing 4,000 grams or more.

The Massachusetts low birthweight rate for black non-Hispanic women, 11.3%, was lower than the US rate for all black women, 13.0%. The rate of low birthweight for

Massachusetts Hispanic women (8.3%) was higher than the corresponding preliminary 1997 U.S. rate of 6.4% (National Vital Statistics Report, Vol. 47, No. 4, October 7, 1998, p.3). This may be due to differences in the composition of the Hispanic population in Massachusetts and the nation as a whole. In Massachusetts, the Hispanic population is comprised mainly of Puerto Ricans, Dominicans, and Central Americans. The U.S. Hispanic population has a much greater percentage of Mexicans and Cubans who have relatively low rates of low birthweight. The Massachusetts low birthweight rate for Puerto Ricans, 9.1% in 1997, (Table 2) was almost the same as the U.S. Puerto Rican low birthweight of 9.2% in 1996 (NCHS, Health United States, 1998, p. 181).

### **Birthweight and Age of Mother**

In general, the relation between mother's age and percentage low birthweight follows a U-shaped distribution: the percentage of low birthweight deliveries is highest among women under age 20 or over age 35, and lowest among women between the ages 25-34 (Table 10). Black non-Hispanic women delivered higher percentages of low birthweight infants than other race/ethnicity groups for most age-race groups.

### **Birthweight and Smoking**

Cigarette smoking during pregnancy increases the likelihood of delivering a low birthweight infant. In 1997 in Massachusetts, 10.6% of smoking mothers delivered low birthweight infants while only 6.5% of non-smoking mothers had low birthweight deliveries. More than 1 out of 7 (14.9%) black women who smoked during their pregnancy delivered a low birthweight infant (Figure 7).

### **Preterm Deliveries**

In 1997, 7.3% (5,833) of infants born to Massachusetts resident women were preterm (premature) infants, born before the mother had completed the 37th week of pregnancy (Table 11). This is a slight increase from 7.1% in 1996. The greatest increase in the number of preterm infants occurred in the lowest gestational age categories. There was a 14% increase in the number of live births under 24 weeks gestation, and there was a 20% increase in live births with gestational ages from 24-27 weeks. This is consistent with an increase in the number of multiple births as well as more complete coding of very premature live births.

The proportion of early gestational age varied by mother's race and ethnicity. Black non-Hispanic women had the highest proportion of early deliveries, 11.1%; Hispanic women had 8.7% early deliveries; American Indian and other ethnicities, 8.5%; white non-Hispanic women, 6.8%; and Asian women, 5.8% (Table 11).

### **Normal Term Deliveries**

A normal gestational age infant is defined as a baby delivered between the completion of the 37th and 42nd week of pregnancy. In 1997, 91.7% of infants were born at normal gestational age (Table 11). Asian women had the highest proportion of normal gestational age deliveries, 93.3%; white non-Hispanic deliveries, 92.3%; Hispanic deliveries, 90.5%; American Indian and other ethnicities, 90.2%; and black non-Hispanic deliveries, 87.8%.

**Table 9. Births by Birthweight, Race and Hispanic Ethnicity, Massachusetts: 1997**

Birthweight	Total		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other		Unknown	
	#	% <sup>1</sup>	#	%	#	%	#	%	#	%	#	%	#	%
<b>State Total</b>	80,321	100.0	61,143	100.0	5,457	100.0	8,211	100.0	3,876	100.0	1,427	100.0	207	100.0
<b>&lt;500</b>	117	0.1	66	0.1	17	0.3	26	0.3	2	-- <sup>2</sup>	2	-- <sup>2</sup>	4	-- <sup>2</sup>
<b>500-999</b>	438	0.5	296	0.5	75	1.4	41	0.5	11	0.3	13	0.9	2	-- <sup>2</sup>
<b>1000-1499</b>	543	0.7	372	0.6	73	1.3	70	0.9	16	0.4	11	0.8	1	-- <sup>2</sup>
<b>1500-1999</b>	1,100	1.4	774	1.3	125	2.3	124	1.5	49	1.3	22	1.5	6	2.9
<b>2000-2499</b>	3,419	4.3	2,407	3.9	327	6.0	419	5.1	186	4.8	76	5.3	4	-- <sup>2</sup>
<b>2500-2999</b>	11,663	14.5	7,908	12.9	1,078	19.8	1,566	19.1	812	20.9	277	19.4	22	10.6
<b>3000-3499</b>	28,423	35.4	20,913	34.2	2,025	37.1	3,215	39.2	1,681	43.4	542	38.0	47	22.7
<b>3500-3999</b>	24,879	31.0	20,136	32.9	1,307	24.0	2,119	25.8	931	24.0	357	25.0	29	14.0
<b>4000-4499</b>	8,034	10.0	6,881	11.3	350	6.4	520	6.3	160	4.1	113	7.9	10	4.8
<b>4500-4999</b>	1,428	1.8	1,226	2.0	66	1.2	99	1.2	22	0.6	11	0.8	4	-- <sup>2</sup>
<b>&gt;=5000</b>	142	0.2	126	0.2	7	0.1	7	0.1	2	-- <sup>2</sup>	0	0.0	0	0.0
<b>Unknown</b>	135	0.2	38	0.1	7	0.1	5	0.1	4	0.1	3	0.2	78	37.7
<b>VLBW<sup>3</sup> (0-1499 gms)</b>	1,098	1.4	734	1.2	165	3.0	137	1.7	29	0.7	26	1.8	7	3.4
<b>LBW<sup>4</sup> (0-2499 gms)</b>	5,617	7.0	3,915	6.4	617	11.3	680	8.3	264	6.8	124	8.7	17	8.2

<sup>1</sup>Percentages are based on column totals.

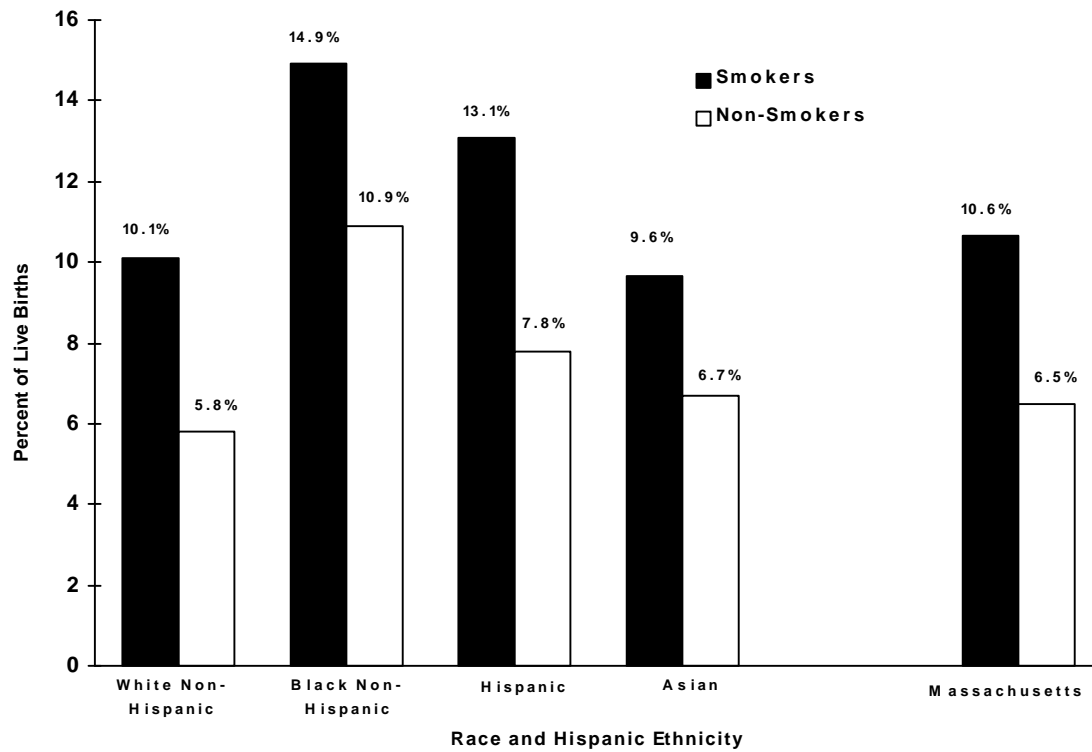
<sup>2</sup>Calculations based on fewer than five events are excluded.

<sup>3</sup>VLBW: Very Low Birthweight.

<sup>4</sup>LBW: Low Birthweight.

NOTE: See Technical Foreword for changes in birth data collection.

**Figure 7. Low Birthweight<sup>1</sup> Among Smoking and Nonsmoking<sup>2</sup> Mothers, by Race and Hispanic Ethnicity, Massachusetts: 1997**



<sup>1</sup>Low birthweight=less than 2,500 grams or 5.5 pounds.

<sup>2</sup>Based on information provided on the birth certificate by the mother.

NOTE: Maternal smoking is self-reported, usually following the birth of their child; these data should be interpreted cautiously.

**Table 10. Low Birthweight<sup>1</sup> by Maternal Age, Race and Hispanic Ethnicity, Massachusetts: 1997**

Mother's Age	Total LBW		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other		Unknown	
	#	% <sup>3</sup>	#	% <sup>3</sup>	#	% <sup>3</sup>	#	% <sup>3</sup>	#	% <sup>3</sup>	#	% <sup>3</sup>	#	% <sup>3</sup>
<b>State Total<sup>2</sup></b>	5,617	7.0	3,915	6.4	617	11.3	680	8.3	264	6.8	124	8.7	17	8.3
<b>&lt;18</b>	248	11.2	73	8.2	47	14.2	104	13.1	15	14.2	9	11.8	0	0.0
<b>18-19</b>	312	8.4	151	7.7	53	11.4	75	7.4	15	13.9	14	10.9	4	-- <sup>4</sup>
<b>20-24</b>	843	7.2	440	6.3	145	11.4	191	7.6	36	7.2	29	8.0	2	-- <sup>4</sup>
<b>25-29</b>	1,270	6.1	907	5.7	126	9.5	127	6.5	80	6.6	27	7.2	3	-- <sup>4</sup>
<b>30-34</b>	1,689	6.4	1,324	6.0	143	11.4	111	8.5	83	6.5	25	8.2	3	-- <sup>4</sup>
<b>35-39</b>	1,039	7.9	846	7.5	84	12.6	57	10.6	29	5.4	19	12.7	4	-- <sup>4</sup>
<b>40+</b>	216	8.8	174	8.5	19	13.7	15	15.5	6	4.7	1	-- <sup>4</sup>	1	-- <sup>4</sup>

<sup>1</sup>Low Birthweight: an infant weighing < 2,500 grams or 5.5 pounds at birth.

<sup>2</sup>State totals include women of unknown age.

<sup>3</sup>Percentages are based upon the number of low birthweight infants divided by the total births in each age and race/ethnicity category.

<sup>4</sup>Calculations based on fewer than five events are excluded.

**Table 11. Births by Gestational Age<sup>1</sup>, Race, and Hispanic Ethnicity, Massachusetts: 1997**

Gestational Age (weeks completed)	Total		White non-Hispanic		Black non-Hispanic		Hispanic		Asian		Other		Unknown	
	#	% <sup>2</sup>	#	%	#	%	#	%	#	%	#	%	#	%
<b>State Total</b>	80,321	100.0	61,143	100.0	5,457	100.0	8,211	100.0	3,876	100.0	1,427	100.0	207	100.0
<b>&lt;20</b>	14	0.0	9	0.0	0	0.0	5	0.1	0	0.0	0	0.0	0	0.0
<b>20-23</b>	148	0.2	84	0.1	27	0.5	23	0.3	5	0.1	6	0.4	3	-- <sup>3</sup>
<b>24-27</b>	335	0.4	228	0.4	51	0.9	39	0.5	7	0.2	10	0.7	0	0.0
<b>28-31</b>	660	0.8	451	0.7	87	1.6	85	1.0	17	0.4	17	1.2	3	-- <sup>3</sup>
<b>32-35</b>	2,602	3.2	1,867	3.1	275	5.0	309	3.8	97	2.5	50	3.5	4	-- <sup>3</sup>
<b>36</b>	2,074	2.6	1,516	2.5	163	3.0	254	3.1	97	2.5	39	2.7	5	2.4
<b>37-39<sup>4</sup></b>	27,058	33.7	19,776	32.3	2,100	38.5	3,070	37.4	1,560	40.2	516	36.2	36	17.4
<b>40</b>	31,360	39.0	24,493	40.1	1,793	32.9	2,974	36.2	1,533	39.6	524	36.7	43	20.8
<b>41</b>	12,120	15.1	9,680	15.8	699	12.8	1,099	13.4	438	11.3	198	13.9	6	2.9
<b>42</b>	3,107	3.9	2,488	4.1	197	3.6	284	3.5	87	2.2	48	3.4	3	-- <sup>3</sup>
<b>43</b>	176	0.2	110	0.2	20	0.4	30	0.4	11	0.3	5	0.4	0	0.0
<b>44+</b>	78	0.1	49	0.1	11	0.2	12	0.1	4	-- <sup>3</sup>	2	-- <sup>3</sup>	0	0.0
<b>Unknown<sup>5</sup></b>	589	0.7	392	0.6	34	0.6	27	0.3	20	0.5	12	0.8	104	50.2
<b>Very early gestation, &lt;28 weeks</b>	497	0.6	321	0.5	78	1.4	67	0.8	12	0.3	16	1.1	3	-- <sup>3</sup>
<b>Preterm, &lt;37 weeks<sup>6</sup></b>	5,833	7.3	4,155	6.8	603	11.1	715	8.7	223	5.8	122	8.5	15	7.2

<sup>1</sup> A clinical estimate of the number of weeks of pregnancy completed; as estimated by the attendant at birth or the postnatal physician.

<sup>2</sup> Percentages are based on column total.

<sup>3</sup> Calculations based on fewer than five events are excluded.

<sup>4</sup> Normal gestational age is defined as 37-42 weeks.

<sup>5</sup> Estimate of gestational age not provided.

<sup>6</sup> Also known as early gestational age, premature delivery, or preterm delivery.

**NOTE:** See Technical Foreword for changes in birth data collection.



## **CHAPTER 4**

### **ADEQUACY OF PRENATAL CARE**



## **IMPORTANT TECHNICAL NOTE: Changes in Adequacy of Prenatal Care Over Time**

Due to changes in data recorded on the Massachusetts birth certificate, the adequacy of prenatal care index for 1997 is not comparable to the index for years prior to 1996. (The adequacy of prenatal care index is based on two factors: the trimester of pregnancy during which a woman enters prenatal care and the number of prenatal care visits made. For a woman to have adequate prenatal care, she must have begun prenatal care in the first trimester and had at least 9 prenatal care visits). Until 1996, the month of the first prenatal care visit was recorded on the birth certificate. The new birth certificate records the exact date of the first visit. This change artificially reduced the estimate of women receiving prenatal care in the first trimester. Thus, although trend data are provided in Figure 8, readers should consider data prior to 1996 separately from data for 1996 and 1997. (Refer to the Technical Foreword for more details.)

***Changes in Adequacy of Prenatal Care, 1980-1995.*** In 1980, 82.7% of white women and 73.2% of black women received adequate prenatal care (Figure 8). The percentage of white women receiving adequate prenatal care remained fairly constant during the 1980s. In contrast, the proportion of black women receiving adequate care declined from approximately seven out of ten women (73.2%) in 1980 to six out of ten women in 1985 but has been increasing since 1989. The percentage of black women receiving adequate prenatal care rose from 60.0% in 1990 to 70.7% in 1995. The percentage of white women receiving adequate prenatal care rose from 82.5% in 1990 to 85.7% in 1995.

***Adequacy of Prenatal Care, White and Black Women: 1996-1997.*** In 1996, the percentage of white women receiving adequate prenatal care was 82.0%. This proportion remained constant in 1997. The percentage of black women receiving adequate prenatal care in 1997 was also relatively constant, with 66.1% in 1996 and 65.4% in 1997.

### **Adequacy and Low Birthweight**

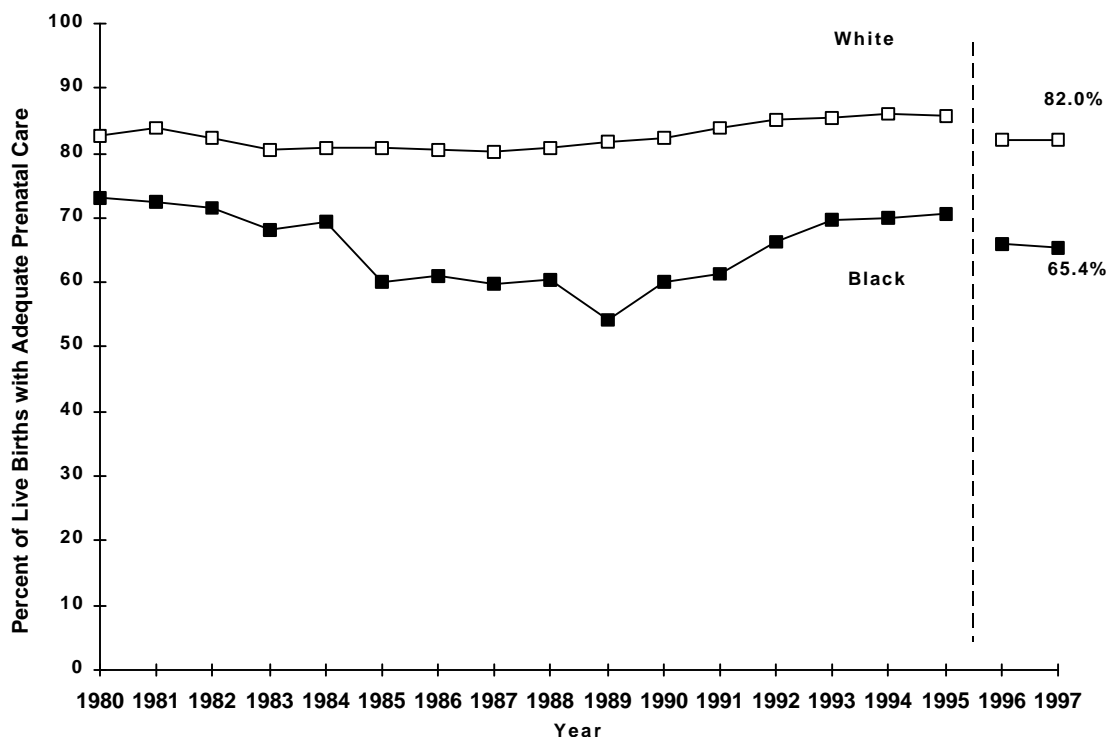
The percentage of low birthweight deliveries declined with increased adequacy of prenatal care in most race/ethnicity groups. In all categories of prenatal care adequacy, black non-Hispanic mothers had the highest percentage of low birthweight infants (Table 12). Among women who received late or no prenatal care, 8.0% of births were low birthweight. In that prenatal care category, 7.3% of the infants born to white, non-Hispanic women were low birthweight; 11.6% of infants born to black, non-Hispanic women were low birthweight; 6.0% of the infants born to Hispanic women were low birthweight; and among Asian mothers who received late or no prenatal care, 7.3% of their infants were low birthweight.

In contrast, only 6.4% of Massachusetts women who received adequate prenatal care delivered low birthweight infants. For women with adequate prenatal care, the low birthweight rate was 5.9% for white non-Hispanic women, 10.4% for black non-Hispanic women, 8.0% for Hispanic women, and 6.3% for Asian women.

### **Adequacy of Prenatal Care in Selected Population Groups**

Adequacy of care increased with age of the mother. Among women who were less than 18 years of age at delivery, only 53.5% received adequate prenatal care. Among women who were 35 years of age or older at delivery, 85.4% received adequate prenatal care (Figure 9). Other selected population groups that had lower than the state average of adequate prenatal care included: women ages 20 or older with fewer than 12 years of education (64.4%); unmarried women (65.3%); mothers who smoked during pregnancy (70.5%); and foreign-born mothers (72.4%). First-time mothers and mothers who reported that they were planning to breastfeed had slightly higher percentages of prenatal care adequacy than the statewide rate of 80.1%.

**Figure 8. Trends in Adequacy of Prenatal Care<sup>1,2</sup> by Race<sup>3</sup>, Massachusetts: 1980-1997**



<sup>1</sup>Calculations are based on births with known Adequacy of Prenatal Care scores.

<sup>2</sup>Due to changes beginning in 1996 in the collection of information on Adequacy of Prenatal Care, caution should be used when comparing these data over time. Refer to the Technical Foreword for an explanation of changes.

<sup>3</sup>On tables and graphs which include data prior to June 1986, the race classifications do not include ethnicity; most Hispanics are included in the race category of whites.

**Table 12. Low Birthweight by Level of Prenatal Care and Race  
and Hispanic Ethnicity, Massachusetts: 1997**

Race, Ethnicity, and Birthweight		Total <sup>1</sup>	Level of Prenatal Care <sup>2</sup>		
			Adequate	Intermediate	Late/None
<b>STATE TOTAL</b>	Total	78,779	63,134	13,067	2,578
	#	5,304	4,031	1,067	206
	%	6.7	6.4	8.2	8.0
<b>White non- Low Birthweight<sup>3</sup></b>	Total	60,165	50,615	8,347	1,203
	#	3,725	3,001	636	88
	%	6.2	5.9	7.6	7.3
<b>Black non-Hispanic Low Birthweight<sup>3</sup></b>	Total	5,277	3,504	1,317	456
	#	557	363	141	53
	%	10.6	10.4	10.7	11.6
<b>Hispanic Low Birthweight<sup>ht3</sup></b>	Total	8,055	5,343	2,100	612
	#	643	425	181	37
	%	8.0	8.0	8.6	6.0
<b>Asian Low Birthweight<sup>3</sup></b>	Total	3,815	2,753	898	164
	#	252	173	67	12
	%	6.6	6.3	7.5	7.3
<b>Other/Unknown Low Birthweight<sup>3</sup></b>	Total	1,467	919	405	143
	#	127	69	42	16
	%	8.7	7.5	10.4	11.2

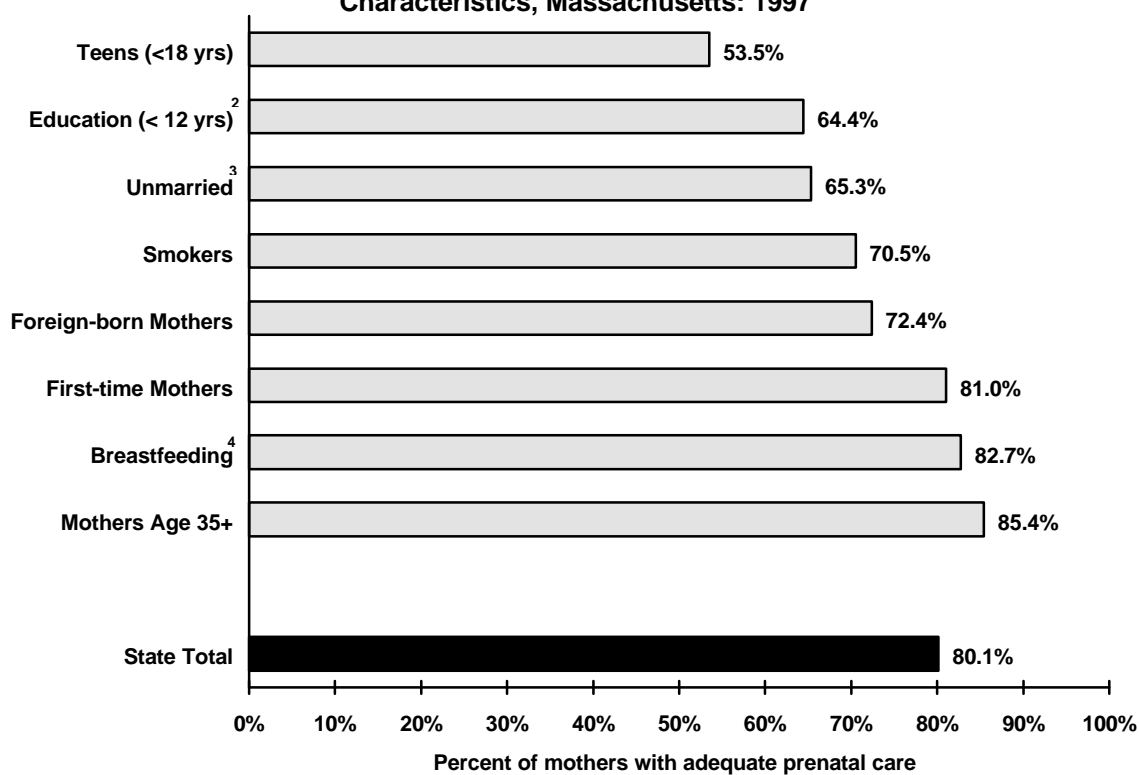
<sup>1</sup> All data are based on the 78,779 births with known Adequacy of Prenatal Care data.

<sup>2</sup> Detailed explanation of the levels of prenatal care is presented in the Glossary.

<sup>3</sup> Low birthweight: <2,500 grams or 5.5 pounds.

NOTE: See Technical Foreword for changes in birth data collection.

**Figure 9. Adequacy of Prenatal Care<sup>1</sup> for Selected Population Characteristics, Massachusetts: 1997**



<sup>1</sup>Calculations are based on births with known Adequacy of Prenatal Care scores.

<sup>2</sup>Women 20 years of age and older.

<sup>3</sup>Pertains to marital status at time of conception.

<sup>4</sup>Mother was or was intending to breastfeed at the time the birth certificate was completed.



## **CHAPTER 5**

### **PRENATAL CARE SOURCE OF PAYMENT**



## **Prenatal Care Payment Source**

In 1997, 71.3% of all Massachusetts women had their prenatal care paid for by private insurers, such as Blue Cross/Blue Shield, health maintenance organizations (HMOs), and commercial insurers (Figure 10). Public entitlement programs, including Medicaid and Healthy Start (a Massachusetts-funded program), covered the prenatal care medical expenses of 24.4% of Massachusetts women who gave birth. An additional 1.0% of women paid for their prenatal care by themselves.

## **Characteristics of Women Who Use Publicly Financed and Private Insured Prenatal Care**

Maternal and birth characteristics vary according to whether prenatal care was financed through public programs or through private insurance. Differences in characteristics between those served by public programs and those covered by private insurance may reflect different levels of risk rather than the quality of care received. Among women whose prenatal care was funded by Medicaid, 22.3% were under the age of 20. In contrast, only 2.8% of women whose prenatal care was privately insured were under age 20 (Table 13).

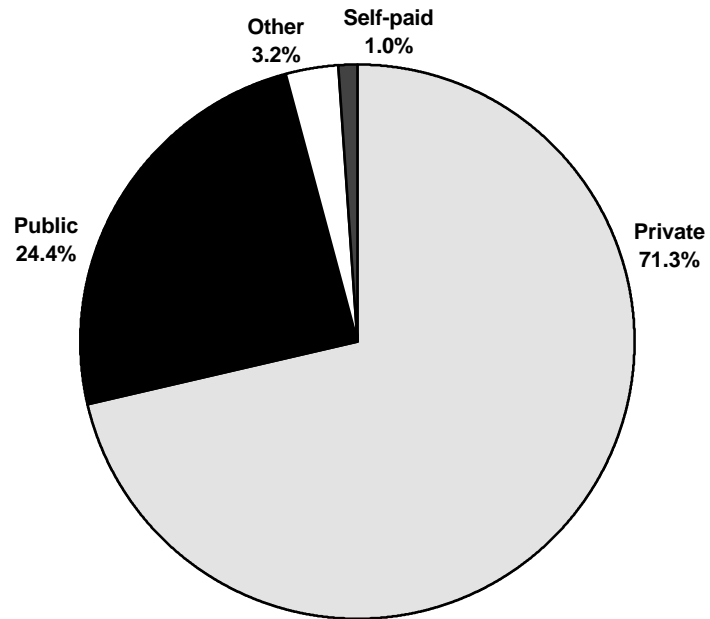
Women whose prenatal care was publicly funded had a higher proportion of low birthweight deliveries (8.5%) than women whose prenatal care was privately insured (6.3%). This difference can be seen among all race/ethnicity groups.

Similarly, women whose prenatal care was publicly financed were less likely to receive adequate prenatal care in all race-ethnicity groups. For example, only 55.7% of black non-Hispanic women whose prenatal care was publicly financed received adequate prenatal care, while 80.6% of black non-Hispanic women with private insurance received adequate prenatal care (Table 13).

In all race/ethnicity groups, women whose prenatal care was publicly financed were less likely to deliver by Cesarean section. Overall, the Cesarean section rate was 16.9% for women with publicly funded prenatal care and 20.9% for women with private insurance. Asian women with publicly funded prenatal care had the lowest Cesarean section rate (11.7%).

Women whose prenatal care was publicly funded were much less likely to report an intent to breastfeed than women who had private insurance. Among white non-Hispanic women, for example, 47.8% of those whose prenatal care was publicly funded reported an intent to breastfeed compared to 72.5% among those whose prenatal care was privately financed.

**Figure 10. Distribution of Prenatal Care Payment Source<sup>1</sup>,  
Massachusetts: 1997**



<sup>1</sup>The source of payment for prenatal care is a self-reported item on the birth certificate. Private: Blue Cross/Blue Shield, commercial insurance and HMO's. Public: Medicaid, Medicare, Healthy Start, free care, and other government sources. Other: Worker's Compensation and other sources.

**Table 13. Birth Characteristics by Source of Prenatal Care Payment, Race, and Hispanic Ethnicity, Massachusetts: 1997**

Race, Ethnicity, and Payment Source	Births <sup>1</sup>		Teen Births				Birthweight			
			<18 Years		<20 Years		Very Low <sup>2</sup>		Low <sup>3</sup>	
	#	%	#	%	#	%	#	%	#	%
<b>STATE TOTAL<sup>4</sup></b>	80,321	100.0	2,208	2.7	5,904	7.4	1,098	1.4	5,617	7.0
Public	19,607	24.4	1,486	7.6	4,056	20.7	305	1.6	1,668	8.5
Medicaid	17,146	21.3	1,428	8.3	3,825	22.3	283	1.7	1,500	8.7
Other Public <sup>5</sup>	2,461	3.1	58	2.4	231	9.4	22	0.9	168	6.8
Private <sup>6</sup>	57,236	71.3	615	1.1	1,588	2.8	693	1.2	3,618	6.3
<b>White non-Hispanic</b>	61,143	100.0	893	1.5	2,865	4.7	734	1.2	3,915	6.4
Public	9,393	15.4	472	5.0	1,645	17.5	111	1.2	720	7.7
Medicaid	8,481	13.9	461	5.4	1,587	18.7	104	1.2	670	7.9
Other Public <sup>5</sup>	912	1.5	11	1.2	58	6.4	7	0.8	50	5.5
Private <sup>6</sup>	49,134	80.4	375	0.8	1,087	2.2	550	1.1	2,953	6.0
<b>Black non-Hispanic</b>	5,457	100.0	330	6.0	794	14.6	165	3.0	617	11.3
Public	2,920	53.5	233	8.0	599	20.5	77	2.6	340	11.6
Medicaid	2,593	47.5	225	8.7	568	21.9	70	2.7	304	11.7
Other Public <sup>5</sup>	327	6.0	8	2.4	31	9.5	7	2.1	36	11.0
Private <sup>6</sup>	2,326	42.6	82	3.5	168	7.2	74	3.2	242	10.4
<b>Hispanic</b>	8,211	100.0	796	9.7	1,807	22.0	137	1.7	680	8.3
Public	5,509	67.1	649	11.8	1,487	27.0	93	1.7	457	8.3
Medicaid	4,584	55.8	618	13.5	1,373	30.0	89	1.9	400	8.7
Other Public <sup>5</sup>	925	11.3	31	3.4	114	12.3	4	-- <sup>7</sup>	57	6.2
Private <sup>6</sup>	2,380	29.0	113	4.7	244	10.3	37	1.6	190	8.0
<b>Asian</b>	3,876	100.0	106	2.7	214	5.5	29	0.7	264	6.8
Public	1,019	26.3	82	8.0	172	16.9	8	0.8	80	7.9
Medicaid	923	23.8	78	8.5	160	17.3	8	0.9	77	8.3
Other Public <sup>5</sup>	96	2.5	4	-- <sup>7</sup>	12	12.5	0	-- <sup>7</sup>	3	-- <sup>7</sup>
Private <sup>6</sup>	2,737	70.6	22	0.8	40	1.5	20	0.7	180	6.6
<b>Other/Unknown<sup>8</sup></b>	1,634	100.0	83	5.1	224	13.7	33	2.0	141	8.6
Public	766	46.9	50	6.5	153	20.0	16	2.1	71	9.3
Medicaid	565	34.6	46	8.1	137	24.2	12	2.1	49	8.7
Other Public <sup>5</sup>	201	12.3	4	-- <sup>7</sup>	16	8.0	4	-- <sup>7</sup>	22	10.9
Private <sup>6</sup>	659	40.3	23	3.5	49	7.4	12	1.8	53	8.0

**Table 13 (cont'd). Birth Characteristics by Source of Prenatal Care Payment, Race, and Hispanic Ethnicity, Massachusetts: 1997**

Race, Ethnicity, and Payment Source	Prenatal Care							
	Adequate #	%	Began 1st Trimester #	%	Cesarean Section #	%	Breastfeeding <sup>9</sup> #	%
<b>STATE TOTAL<sup>4</sup></b>	63,134	80.1	67,035	84.4	15,853	19.8	53,231	67.9
<b>Public</b>	12,149	63.2	13,258	68.5	3,318	16.9	10,310	53.2
<b>Medicaid</b>	10,607	63.1	11,559	68.3	2,862	16.7	8,523	50.2
<b>Other Public<sup>5</sup></b>	1,542	64.0	1,699	70.1	456	18.5	1,787	73.8
<b>Private<sup>6</sup></b>	48,881	86.2	51,292	90.1	11,936	20.9	41,645	73.1
<b>White non-Hispanic</b>	50,615	84.1	53,423	88.1	12,348	20.2	40,805	68.4
<b>Public</b>	6,268	67.9	6,721	72.4	1,650	17.6	4,470	47.8
<b>Medicaid</b>	5,627	67.5	6,028	72.0	1,467	17.3	3,829	45.3
<b>Other Public<sup>5</sup></b>	641	71.2	693	76.7	183	20.1	641	70.8
<b>Private<sup>6</sup></b>	42,594	87.4	44,634	91.2	10,220	20.8	35,503	72.5
<b>Black non-Hispanic</b>	3,504	66.4	3,870	72.5	1,145	21.0	3,281	61.9
<b>Public</b>	1,573	55.7	1,819	63.7	506	17.3	1,467	51.5
<b>Medicaid</b>	1,418	56.5	1,632	64.3	444	17.1	1,267	50.0
<b>Other Public<sup>5</sup></b>	155	49.4	187	59.0	62	19.0	200	62.9
<b>Private<sup>6</sup></b>	1,839	80.6	1,936	84.1	607	26.2	1,706	74.8
<b>Hispanic</b>	5,343	66.3	5,766	71.1	1,456	17.8	5,532	68.2
<b>Public</b>	3,363	62.1	3,661	67.2	887	16.1	3,508	64.4
<b>Medicaid</b>	2,778	61.6	3,028	66.7	739	16.1	2,774	61.1
<b>Other Public<sup>5</sup></b>	585	64.8	633	69.5	148	16.0	734	80.7
<b>Private<sup>6</sup></b>	1,838	78.0	1,943	82.1	518	21.8	1,808	76.5
<b>Asian</b>	2,753	72.2	2,938	76.7	590	15.3	2,627	68.4
<b>Public</b>	564	56.2	607	60.3	119	11.7	427	42.2
<b>Medicaid</b>	505	55.7	544	59.7	108	11.7	364	39.7
<b>Other Public<sup>5</sup></b>	59	61.5	63	65.6	11	11.5	63	66.3
<b>Private<sup>6</sup></b>	2,121	78.4	2,254	83.0	455	16.6	2,130	78.2
<b>Other/Unknown<sup>8</sup></b>	919	62.6	1,038	69.7	314	19.8	986	67.9
<b>Public</b>	381	51.6	450	60.0	156	20.4	438	60.2
<b>Medicaid</b>	279	51.3	327	59.0	104	18.4	289	54.1
<b>Other Public<sup>5</sup></b>	102	52.3	123	62.8	52	25.9	149	76.8
<b>Private<sup>6</sup></b>	489	76.0	525	80.9	136	20.6	498	76.7

<sup>1</sup>In the "Births" category, percentages are based on race/ethnicity totals (group column). For all other categories, percentages are based on Birth totals (row total) excluding unknowns for each characteristic.

<sup>2</sup>Very low birthweight: <1,500 grams or 3.3 pounds.

<sup>3</sup>Low Birthweight: < 2,500 grams or 5.5 pounds.

<sup>4</sup>Total births does not equal Public + Private. Other categories of prenatal care payment are also included in Total: Workers' Compensation, self-paid, and other.

<sup>5</sup>Other Public: Healthy Start, other government programs, and free care.

<sup>6</sup>Private: Blue Cross/Blue Shield, commercial insurance, and HMO.

<sup>7</sup>Calculations based on fewer than five events are excluded.

<sup>8</sup>Other: Mothers who self-designated other races or for whom race was unknown.

<sup>9</sup>Mother was intending to breastfeed at the time the birth certificate was completed.

NOTE: See Technical Foreword for changes in birth data collection.

## **CHAPTER 6**

### **BIRTHS BY HOSPITAL AND COMMUNITY**



In 1997 81,264 births occurred in Massachusetts, a decrease of 13.9% since 1990 (*The percentages and rates provided in Tables 14 and 15 are based on occurrence births and differ from data presented elsewhere in this book, which are based on resident births*).

### **Low Birthweight Variation by Facility**

In 1997, at least 10% of the births in six hospitals were low birthweight. These hospitals were: Baystate Medical Center, Boston Medical Center, Brigham and Women's Hospital, Massachusetts General Hospital, Memorial Hospital (Worcester), and New England Medical Center (Table 14).

### **Publicly Funded Delivery Variation by Facility**

In three hospitals, 50% or more of the deliveries were paid with public funds: Boston Medical Center, Cambridge Hospital, and Mercy Hospital. In seven facilities less than 10% of deliveries were paid with public funds: Boston Regional Medical Center, Emerson, Mount Auburn, Newton-Wellesley, South Shore, The Birthplace at Wellesley, and Winchester Hospital.

### **Prenatal Care Adequacy Variation by Facility**

In 1997, the facilities with the lowest reported rate of adequacy of prenatal care were: Boston Medical Center (37.6%); Lawrence General Hospital (61.1%); and Memorial Hospital (62.6%).

### **Calculating the Percentages of Delivery by Method of Delivery**

Percentages of delivery by method in Table 15 are calculated in following manner:

1. Percentage of total Cesarean sections= (total Cesarean births/all births) x 100.
2. Percentage primary Cesarean sections=(primary cesarean sections/(all births-repeat Cesarean sections-VBACs)) x 100.
3. Percentage repeat Cesarean sections= (repeat Cesarean sections/(repeat Cesarean sections + VBACs)) x100.
4. Percentage of vaginal birth after Cesarean section delivery, that is, VBACs= (VBAC deliveries/(repeat Cesarean sections + VBAC)) x 100. Please note: the sum of the percentage of repeat Cesarean section deliveries + VBACs= 100% of all deliveries of mothers with a prior Cesarean section.

### **Cesarean Section Delivery Variation by Facility**

Cesarean section was the method of delivery for 19.9% of the 1997 occurrence births, comparable to the 20.0% of Cesarean section deliveries in 1996 (Table 15, calculations are based on births with known method of delivery). Facilities with low rates of Cesarean section deliveries were: Hale Hospital, 13.8%; Berkshire Medical Center, 16.0%; Lawrence General Hospital, 16.1%; Tobey Hospital, 16.2%; Cambridge Hospital, 16.5% and Melrose-Wakefield Hospital, 16.5%. In 1997, the Cesarean section rate was less than 30% for the fourth straight

year. Three hospitals had Cesarean section delivery rates of 25% or more (Falmouth Hospital, Mary Lane Hospital, and North Adams Regional Hospital). Primary Cesarean section delivery rates were under 10% at Franklin Medical Center, Deaconess-Waltham Hospital, and Lawrence General Hospital. Primary Cesarean section delivery rates were over 20% at Mary Lane Hospital, Falmouth Hospital, and North Adams Regional Hospital.

Repeat Cesarean section delivery rates were lowest at Hale Hospital; St. Vincent Hospital; Martha's Vineyard Hospital (less than ten deliveries by this method); Berkshire Medical Center, Fairview Hospital; and Heywood Hospital. Hospitals with high rates of repeat Cesarean section deliveries include: Malden Hospital, Deaconess-Waltham Hospital, New England Medical Center, Boston Medical Center, Newton Wellesley Hospital, and North Adams Regional Hospital.

### **Vaginal Birth after Cesarean Section (VBAC) Deliveries**

In 1997, among women with a previous Cesarean section, 33.5% (2,764) had a vaginal birth after a Cesarean section delivery (VBAC). In 1996, 34.0% (2,921) had a VBAC (data not shown). In 1995 the VBAC rate was 31.6%; in 1994, the VBAC rate was 30.2%; in 1993, the VBAC rate was 27.4%; in 1992, 24.8%; in 1991, 24.1%; in 1990, 22.3%; and in 1989, 21.0% (trend data not shown).

Since the sum of the percentage of repeat cesarean section deliveries plus VBACs equals 100% of all births to mothers with a prior Cesarean section, facilities with the lowest repeat Cesarean section delivery rates had the highest VBAC rates. In total, sixteen hospitals had VBAC rates over 40%.

**Table 14. Birth Characteristics by Licensed Maternity Facility, Massachusetts: 1997<sup>1,2</sup>**

Facility	Location	Occurrence Births	Low Birthweight	Public Payment for Delivery <sup>3</sup>	Adequate Prenatal Care
<b>STATE TOTAL<sup>4,5</sup></b>		81,264	7.0	24.4	80.1
Anna Jaques Hospital	Newburyport	726	4.4	14.5	81.5
Baystate Medical Center	Springfield	5,182	10.2	40.4	72.7
Berkshire Medical Center	Pittsfield	917	6.9	27.4	73.7
Beth Israel Deaconess Medical Center	Boston	5,108	9.7	16.2	82.6
Beverly Hospital	Beverly	2,633	4.2	19.0	84.6
Boston Medical Center	Boston	1,542	11.5	86.9	37.6 <sup>6</sup>
Boston Regional Medical Center	Stoneham	1,254	2.2	5.0	82.3
Brigham And Women's Hosp.	Boston	8,831	11.5	17.0	94.7
Brockton Hospital	Brockton	947	7.0	35.8	70.9
Cambridge Hospital	Cambridge	650	3.4	73.2	63.8
Cape Cod Hospital	Barnstable	1,031	4.2	23.6	82.6
Charlton Memorial Hospital	Fall River	1,627	6.0	33.9	79.5
Cooley Dickinson Hospital	Northampton	937	1.9	17.5	84.7
Deaconess Waltham Hospital	Waltham	244	4.9	37.7	76.9
Emerson Hospital	Concord	1,480	2.2	4.9	87.0
Fairview Hospital	Great Barrington	181	3.3	35.9	79.1
Falmouth Hospital	Falmouth	621	3.4	33.0	70.6
Franklin Medical Center	Greenfield	567	4.1	36.1	73.4
Good Samaritan Medical Center	Brockton	1,315	4.9	37.0	66.7
Hale Hospital	Haverhill	529	4.2	43.6	71.5
Harrington Memorial Hospital	Southbridge	441	4.8	37.4	84.9
Heywood Hospital	Gardner	444	3.2	34.5	67.5
Holy Family Hospital and Medical Center	Methuen	1,132	3.1	19.6	78.7
Holyoke Hospital	Holyoke	457	6.1	42.0	73.8
Jordan Hospital	Plymouth	819	2.9	25.6	76.4
Lawrence General Hospital	Lawrence	1,415	5.3	49.6	61.1
Leominster Hospital	Leominster	1,446	4.4	27.9	73.5
Lowell General Hospital	Lowell	2,328	5.2	33.7	66.4
Malden Hospital	Malden	469	4.1	33.5	67.3
Martha's Vineyard Hospital	Oak Bluffs	129	2.3	29.5	80.7
Mary Lane Hospital	Ware	194	5.7	35.6	76.6
Massachusetts General Hospital	Boston	2,266	13.2	29.8	72.7
Melrose-Wakefield Hospital	Melrose	1,307	3.4	12.9	89.9
Memorial Hospital	Worcester	3,982	11.6	27.2	62.6
Mercy Hospital	Springfield	617	3.9	52.4	70.5
Metrowest Medical Center-Framingham Union Campus	Framingham	2,661	4.5	11.0	89.9

**Table 14. (cont'd) Births Characteristics by Licensed Maternity Facility, Massachusetts: 1997<sup>1,2</sup>**

Facility	Location	Occurrence Births	Low Birthweight	Public Payment for Delivery <sup>3</sup>	Adequate Prenatal Care
Milford-Whitinsville Regional Hospital	Milford	576	3.1	21.6	81.8
Morton Hospital	Taunton	703	3.4	34.3	80.6
Mount Auburn Hospital	Cambridge	1,207	4.1	8.2	87.9
Nantucket Cottage Hospital	Nantucket	72	1.4	16.7	82.6
New England Medical Center Hospital	Boston	1,588	22.0	36.3	84.8
Newton Wellesley Hospital	Newton	4,257	4.2	1.0	87.9
North Adams Regional Hospital	North Adams	355	4.2	38.9	87.8
North Shore Birth Center	Beverly	89	0.0	10.1	79.8
North Shore Medical Center - Salem Hospital	Salem	1,731	4.7	31.7	88.9
Norwood Hospital	Norwood	994	2.1	11.2	89.0
Quincy Hospital	Quincy	660	3.9	30.5	77.7
Saint Vincent Hospital	Worcester	2,000	4.0	17.0	78.7
Saints Memorial Medical Ctr.- St. John's Campus	Lowell	518	4.8	29.3	76.7
South Shore Hospital	Weymouth	3,186	4.1	4.7	94.4
St. Elizabeth's Medical Center of Boston	Boston	1,682	9.6	29.4	87.9
St. Luke's Hospital	New Bedford	1,557	5.1	46.0	74.6
Sturdy Memorial Hospital	Attleboro	829	3.6	25.7	79.2
The Birthplace At Wellesley	Wellesley	83	0.0	2.4	62.7
Tobey Hospital	Wareham	452	5.1	31.2	86.4
Winchester Hospital	Winchester	2,036	5.8	4.6	80.8
All Other Hospitals <sup>7</sup>		9	22.2	44.4	85.7
Home births, enroute, other		251	10.4	22.3	55.0

<sup>1</sup>See Glossary for definitions of occurrence births.

<sup>2</sup>A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth.

<sup>3</sup>Public payment for delivery includes Medicaid/Commonwealth, Medicare, Healthy Start, other government programs, and free care.

<sup>4</sup>Percentages calculated on births with known method of delivery.

<sup>5</sup>The percentages provided in this row are based on occurrence births and may differ from data presented elsewhere in this book which are based on resident births. For percentage calculations, denominators exclude unknown values.

<sup>6</sup>This percent should be interpreted with caution because of inconsistencies and incompleteness in the information that is used in the calculation of Adequacy of Prenatal Care. For example, there are 46 records that contain a date for the first prenatal care visit but the number of total visits reported is zero (0). Other inconsistencies and inaccuracies in the prenatal care data from Boston Medical Center are currently under review by the Registry of Vital Records and Statistics.

<sup>7</sup>Includes 2 births which occurred at the Cambridge Birth Center which opened on December 9, 1997.

**Table 15. Cesarean Section Deliveries and Vaginal Births after Cesarean Section (VBACs) by Licensed Maternity Facility, Massachusetts: 1997<sup>1,2,3</sup>**

Facility	Occurrence Births	Total C- Sections		Primary C- Section		Repeat C- Section		VBACs	
		#	% <sup>4</sup>	#	% <sup>5</sup>	#	% <sup>6</sup>	#	% <sup>7</sup>
<b>STATE TOTAL</b>	81,264	16,122	19.9	10,634	14.6	5,488	66.5	2,764	33.5
Anna Jaques Hospital	726	131	18.0	95	14.2	36	61.0	23	39.0
Baystate Medical Center	5,182	1,014	19.6	676	14.5	338	63.8	192	36.2
Berkshire Medical Center	917	147	16.0	87	10.8	60	53.6	52	46.4
Beth Israel Deaconess Medical Center	5,108	1,148	22.5	772	17.3	376	58.1	271	41.9
Beverly Hospital	2,633	448	17.1	283	12.1	165	59.8	111	40.2
Boston Medical Center	1,542	284	18.6	195	13.7	89	85.6	15	14.4
Boston Regional Medical Center	1,254	254	20.3	145	13.3	109	66.5	55	33.5
Brigham And Women's Hospital	8,831	2,002	22.8	1,379	17.5	623	68.8	282	31.2
Brockton Hospital	947	189	20.0	105	12.6	84	73.0	31	27.0
Cambridge Hospital	650	107	16.5	73	12.2	34	68.0	16	32.0
Cape Cod Hospital	1,031	196	19.0	113	12.7	83	59.3	57	40.7
Charlton Memorial Hospital	1,627	314	19.3	186	12.7	128	80.0	32	20.0
Cooley Dickinson Hospital	937	177	18.9	129	15.0	48	62.3	29	37.7
Deaconess Waltham Hospital	244	41	16.8	21	9.5	20	87.0	3	13.0
Emerson Hospital	1,480	294	19.9	195	14.8	99	61.5	62	38.5
Fairview Hospital	181	32	17.7	18	11.6	14	53.8	12	46.2
Falmouth Hospital	621	157	25.3	112	20.3	45	66.2	23	33.8
Franklin Medical Center	567	89	15.7	47	9.3	42	66.7	21	33.3
Good Samaritan Medical Center	1,315	251	19.1	180	15.1	71	59.7	48	40.3
Hale Hospital	529	73	13.8	51	10.7	22	43.1	29	56.9
Harrington Memorial Hospital	441	88	20.0	55	14.2	33	60.0	22	40.0
Heywood Hospital	444	75	16.9	48	12.2	27	54.0	23	46.0
Holy Family Hospital and Medical Center	1,132	278	24.6	180	18.1	98	70.0	42	30.0
Holyoke Hospital	457	94	20.6	64	15.4	30	73.2	11	26.8
Jordan Hospital	819	183	22.4	100	14.0	83	80.6	20	19.4
Lawrence General Hospital	1,415	228	16.1	126	9.9	102	74.5	35	25.5
Leominster Hospital	1,446	253	17.5	152	11.9	101	61.6	63	38.4
Lowell General Hospital	2,328	376	16.2	216	10.5	160	61.1	102	38.9
Malden Hospital	469	115	24.7	74	17.5	41	93.2	3	6.8
Martha's Vineyard Hospital	129	29	22.5	21	18.6	8	50.0	8	50.0
Mary Lane Hospital	194	52	26.8	36	21.1	16	69.6	7	30.4
Massachusetts General Hospital	2,266	503	22.5	406	19.3	97	70.8	40	29.2
Melrose-Wakefield Hospital	1,307	216	16.5	133	11.4	83	57.6	61	42.4
Memorial Hospital	3,982	688	17.3	448	12.6	240	56.2	187	43.8
Mercy Hospital	617	107	17.3	66	11.7	41	80.4	10	19.6
Metrowest Medical Center- Framingham Union Campus	2,661	482	18.1	371	14.9	111	65.3	59	34.7

**Table 15 (cont'd). Cesarean Section Deliveries and Vaginal Births After Cesarean Section (VBACs) by Licensed Maternity Facility, Massachusetts: 1997<sup>1,2,3</sup>**

Facility	Occurrence Births	Total C-Sections		Primary C-Section		Repeat C-Section		VBACs	
		#	% <sup>4</sup>	#	% <sup>5</sup>	#	% <sup>6</sup>	#	% <sup>7</sup>
Milford-Whitinsville Regional Hospital	576	112	19.5	68	13.2	44	74.6	15	25.4
Morton Hospital	703	174	24.8	107	17.8	67	65.0	36	35.0
Mount Auburn Hospital	1,207	236	19.6	171	15.6	65	57.0	49	43.0
Nantucket Cottage Hospital	72	13	18.1	9	13.2	4	100.0	0	0.0
New England Medical Center Hospital	1,588	372	23.5	243	16.9	129	86.0	21	14.0
Newton Wellesley Hospital	4,257	892	21.0	652	16.4	240	84.2	45	15.8
North Adams Regional Hospital	355	97	27.3	63	20.1	34	81.0	8	19.0
North Shore Birth Center	89	1	1.1	1	1.1	0	-	0	-
North Shore Medical Center - Salem Hospital	1,731	343	19.8	215	13.8	128	73.6	46	26.4
Norwood Hospital	994	226	22.7	120	14.4	106	65.8	55	34.2
Quincy Hospital	660	153	23.2	96	16.4	57	75.0	19	25.0
Saint Vincent Hospital	2,000	306	15.3	204	11.5	102	47.7	112	52.3
Saints Memorial Medical Ctr. - St. John's Campus	518	88	17.0	64	13.3	24	63.2	14	36.8
South Shore Hospital	3,186	627	19.7	416	14.5	211	67.4	102	32.6
St. Elizabeth's Medical Center of Boston	1,682	410	24.4	264	17.7	146	76.4	45	23.6
St. Luke's Hospital	1,557	338	22.0	210	15.3	128	79.0	34	21.0
Sturdy Memorial Hospital	829	178	21.5	103	14.1	75	78.1	21	21.9
The Birthplace At Wellesley	83	0	0.0	0	0.0	0	0.0	5	100.0
Tobey Hospital	452	73	16.2	52	12.5	21	58.3	15	41.7
Winchester Hospital	2,036	366	18.0	216	11.9	150	70.8	62	29.2
All Other Hospitals <sup>8</sup>	9	1	1.1	1	11.1	0	-	0	-
Home births, enroute	251	1	0.4	1	0.4	0	0.0	3	100.0

<sup>1</sup>See Glossary for definitions of occurrence and Cesarean births, primary and repeat. The percentages provided in this table are based on occurrence births and may differ from data presented elsewhere in this book which are based on resident births.

<sup>2</sup>A licensed maternity facility is a medical unit licensed by the Commonwealth for the care of women during pregnancy and childbirth.

<sup>3</sup>The percentage of Cesarean births reported is not adjusted for risk factors such as mother's age, birthweight, or complications of labor and delivery, which would influence the number of procedures in a particular facility. Caution should be used when comparing unadjusted percentages.

<sup>4</sup>Percentages calculated on births with known method of delivery. Percentage of total Cesarean sections= (total Cesarean births/all births) x 100.

<sup>5</sup>Percentage primary Cesarean sections=(primary cesarean sections/all births-repeat Cesarean sections-VBACs) x 100.

<sup>6</sup>Percentage repeat Cesarean sections= (repeat Cesarean sections/(repeat Cesarean sections + VBACs)) x100.

<sup>7</sup>Percentage VBACs= (VBAC deliveries/(repeat Cesarean sections + VBAC)) x 100.

<sup>8</sup>Includes 2 births which occurred at the Cambridge Birth Center which opened on December 9, 1997.

**Table 16A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths,  
Massachusetts Municipalities, 1997**

<b>Community</b>	<b>Occurrence Births</b>	<b>Resident Births</b>	<b>Low Birthweight</b>	<b>Teen Births, &lt; 20 years</b>	<b>Infant Deaths</b>	<b>Neonatal Deaths</b>
<b>STATE TOTAL</b>	81,264	80,321	5,617	5,904	425	323
Abington	0	194	18	6	1	1
Acton	0	245	24	2	0	0
Acushnet	1	71	-- <sup>1</sup>	6	0	0
Adams	0	92	9	12	0	0
Agawam	0	321	28	14	1	0
Alford	0	3	0	1	0	0
Amesbury	0	222	13	13	0	0
Amherst	2	178	13	13	1	1
Andover	0	350	17	2	1	1
Arlington	0	608	36	6	1	1
Ashburnham	0	59	-- <sup>1</sup>	2	1	1
Ashby	0	26	-- <sup>1</sup>	0	0	0
Ashfield	0	10	0	0	0	0
Ashland	0	267	16	2	1	1
Athol	0	138	13	19	0	0
Attleboro	831	585	27	36	1	1
Auburn	0	156	12	3	2	2
Avon	0	41	-- <sup>1</sup>	3	0	0
Ayer	1	117	-- <sup>1</sup>	8	0	0
Barnstable	1035	484	28	38	6	4
Barre	1	66	-- <sup>1</sup>	1	0	0
Becket	1	19	-- <sup>1</sup>	0	0	0
Bedford	0	250	11	2	0	0
Belchertown	0	177	9	5	0	0
Bellingham	1	220	6	11	0	0
Belmont	0	282	21	2	2	2
Berkley	1	76	-- <sup>1</sup>	0	0	0
Berlin	0	27	-- <sup>1</sup>	2	0	0
Bernardston	0	16	-- <sup>1</sup>	2	0	0
Beverly	2,723	518	37	26	1	1
Billerica	1	565	42	11	1	0
Blackstone	0	98	15	4	0	0
Blandford	0	7	-- <sup>1</sup>	1	0	0
Bolton	0	48	-- <sup>1</sup>	0	0	0
Boston	21,041	7,822	719	840	66	48
Bourne	0	247	17	15	1	1
Boxborough	0	62	-- <sup>1</sup>	0	0	0
Boxford	0	97	5	1	0	0
Boylston	0	39	0	1	0	0
Braintree	0	386	23	13	0	0
Brewster	2	68	-- <sup>1</sup>	2	0	0

**Table 16A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities, 1997**

<b>Community</b>	<b>Occurrence Births</b>	<b>Resident Births</b>	<b>Low Birthweight</b>	<b>Teen Births, &lt; 20 years</b>	<b>Infant Deaths</b>	<b>Neonatal Deaths</b>
Bridgewater	2	285	21	10	1	1
Brimfield	0	43	-- <sup>1</sup>	2	0	0
Brockton	2,264	1,429	136	204	7	5
Brookfield	0	44	-- <sup>1</sup>	2	0	0
Brookline	2	599	44	6	1	1
Buckland	1	13	0	0	0	0
Burlington	1	326	19	6	4	3
Cambridge	1,865	1,015	80	55	3	1
Canton	1	263	19	6	1	0
Carlisle	0	60	-- <sup>1</sup>	0	0	0
Carver	1	119	8	11	1	1
Charlemont	0	15	0	2	1	1
Charlton	0	164	6	12	0	0
Chatham	0	44	-- <sup>1</sup>	3	1	1
Chelmsford	2	462	25	3	3	3
Chelsea	1	619	56	93	3	2
Cheshire	0	36	-- <sup>1</sup>	1	0	0
Chester	0	11	-- <sup>1</sup>	0	0	0
Chesterfield	1	9	0	0	0	0
Chicopee	0	552	38	64	4	2
Chilmark	2	11	0	0	0	0
Clarksburg	0	10	-- <sup>1</sup>	2	0	0
Clinton	1	171	12	17	0	0
Cohasset	0	78	-- <sup>1</sup>	0	2	2
Colrain	0	21	-- <sup>1</sup>	0	0	0
Concord	1,481	164	5	2	0	0
Conway	0	19	-- <sup>1</sup>	1	0	0
Cummington	0	12	0	2	0	0
Dalton	0	62	-- <sup>1</sup>	3	3	2
Danvers	1	243	17	4	1	1
Dartmouth	0	228	9	11	0	0
Dedham	0	298	20	12	4	4
Deerfield	0	50	-- <sup>1</sup>	1	0	0
Dennis	1	131	8	6	0	0
Dighton	0	66	7	3	1	1
Douglas	0	113	8	2	1	1
Dover	0	90	8	1	0	0
Dracut	0	387	23	15	0	0
Dudley	0	101	5	8	0	0
Dunstable	0	45	-- <sup>1</sup>	0	0	0
Duxbury	0	174	9	2	0	0
East Bridgewater	0	164	13	3	0	0
East Brookfield	0	18	-- <sup>1</sup>	2	0	0
East Longmeadow	0	162	9	4	0	0
Eastham	0	34	0	3	0	0

**Table 16A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths,  
Massachusetts Municipalities, 1997**

<b>Community</b>	<b>Occurrence Births</b>	<b>Resident Births</b>	<b>Low Birthweight</b>	<b>Teen Births, &lt; 20 years</b>	<b>Infant Deaths</b>	<b>Neonatal Deaths</b>
Easthampton	3	177	14	18	0	0
Easton	0	274	18	10	2	2
Edgartown	1	48	-- <sup>1</sup>	1	0	0
Egremont	0	7	0	1	0	0
Erving	0	16	-- <sup>1</sup>	3	0	0
Essex	0	43	0	2	0	0
Everett	0	542	37	26	0	0
Fairhaven	1	169	11	10	0	0
Fall River	1,627	1,109	88	141	6	4
Falmouth	623	277	15	27	0	0
Fitchburg	4	513	44	89	1	1
Florida	0	9	-- <sup>1</sup>	0	0	0
Foxborough	0	219	10	2	2	1
Framingham	2,661	953	93	62	3	3
Franklin	1	530	33	8	1	0
Freetown	0	98	5	8	0	0
Gardner	444	217	16	33	3	2
Gay Head	1	2	0	0	0	0
Georgetown	0	106	-- <sup>1</sup>	1	0	0
Gill	0	14	-- <sup>1</sup>	0	0	0
Gloucester	2	353	24	27	3	2
Goshen	0	3	0	0	0	0
Gosnold	0	0	0	0	0	0
Grafton	1	202	14	8	0	0
Granby	0	65	-- <sup>1</sup>	2	0	0
Granville	0	16	0	1	0	0
Great Barrington	183	76	9	3	0	0
Greenfield	569	197	8	17	2	1
Groton	0	163	-- <sup>1</sup>	3	1	0
Groveland	0	97	7	1	1	1
Hadley	1	50	0	5	0	0
Halifax	1	89	5	4	2	2
Hamilton	0	105	-- <sup>1</sup>	4	0	0
Hampden	0	36	-- <sup>1</sup>	1	0	0
Hancock	0	7	0	1	0	0
Hanover	1	171	8	2	0	0
Hanson	0	159	7	8	0	0
Hardwick	0	28	0	4	0	0
Harvard	0	53	0	0	0	0
Harwich	0	88	8	8	1	1
Hatfield	0	35	-- <sup>1</sup>	1	0	0
Haverhill	529	858	63	88	7	6
Hawley	0	6	0	0	0	0
Heath	0	4	0	0	0	0
Hingham	1	284	13	2	0	0

**Table 16A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths,  
Massachusetts Municipalities, 1997**

<b>Community</b>	<b>Occurrence Births</b>	<b>Resident Births</b>	<b>Low Birthweight</b>	<b>Teen Births, &lt; 20 years</b>	<b>Infant Deaths</b>	<b>Neonatal Deaths</b>
Hinsdale	0	27	5	1	0	0
Holbrook	0	117	8	7	1	0
Holden	0	170	14	1	1	0
Holland	0	32	6	2	0	0
Holliston	1	175	10	0	0	0
Holyoke	461	708	57	184	5	4
Hopedale	0	65	6	0	1	1
Hopkinton	0	229	20	3	2	1
Hubbardston	0	58	-- <sup>1</sup>	2	0	0
Hudson	4	237	18	17	3	2
Hull	0	161	12	11	3	2
Huntington	0	28	0	3	0	0
Ipswich	0	129	10	3	0	0
Kingston	0	190	9	5	0	0
Lakeville	1	131	6	6	0	0
Lancaster	1	62	-- <sup>1</sup>	3	0	0
Lanesborough	0	27	-- <sup>1</sup>	2	1	0
Lawrence	1,421	1,313	109	289	19	16
Lee	0	51	-- <sup>1</sup>	0	0	0
Leicester	1	120	9	11	1	1
Lenox	0	29	-- <sup>1</sup>	1	0	0
Leominster	1,449	574	46	45	1	1
Leverett	1	8	0	0	0	0
Lexington	1	286	10	3	0	0
Leyden	0	12	0	0	0	0
Lincoln	1	56	0	0	0	0
Littleton	1	145	7	0	0	0
Longmeadow	1	144	8	1	0	0
Lowell	2,850	1,691	132	281	8	7
Ludlow	0	165	6	12	0	0
Lunenburg	1	104	10	3	0	0
Lynn	0	1,356	114	186	17	11
Lynnfield	0	115	-- <sup>1</sup>	1	0	0
Malden	469	783	42	34	5	4
Manchester	0	58	-- <sup>1</sup>	1	0	0
Mansfield	0	401	26	7	1	1
Marblehead	0	236	10	1	4	3
Marion	0	52	-- <sup>1</sup>	1	0	0
Marlborough	0	518	29	31	6	6
Marshfield	0	353	19	11	2	2
Mashpee	0	153	13	10	0	0
Mattapoisett	0	53	5	1	0	0
Maynard	0	170	7	6	0	0
Medfield	0	182	13	1	0	0
Medford	0	630	39	19	2	2

**Table 16A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths,  
Massachusetts Municipalities, 1997**

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Medway	0	189	8	4	1	0
Melrose	1,307	356	24	7	4	4
Mendon	0	73	-- <sup>1</sup>	2	0	0
Merrimac	0	89	-- <sup>1</sup>	4	0	0
Methuen	1,132	555	24	47	2	1
Middleborough	0	272	23	14	0	0
Middlefield	0	3	0	0	0	0
Middleton	0	72	-- <sup>1</sup>	0	0	0
Milford	578	370	22	17	0	0
Millbury	0	147	18	7	0	0
Millis	1	126	-- <sup>1</sup>	2	0	0
Millville	0	43	-- <sup>1</sup>	3	0	0
Milton	0	332	12	6	2	1
Monroe	0	0	0	0	0	0
Monson	0	93	8	10	0	0
Montague	0	87	-- <sup>1</sup>	12	1	0
Monterey	0	4	-- <sup>1</sup>	0	0	0
Montgomery	0	6	0	1	0	0
Mount Washington	0	4	0	0	0	0
Nahant	0	36	-- <sup>1</sup>	0	0	0
Nantucket	75	110	7	1	1	1
Natick	1	510	33	9	3	2
Needham	1	391	17	2	0	0
New Ashford	0	2	0	0	0	0
New Bedford	1,564	1,229	83	224	6	3
New Braintree	0	10	-- <sup>1</sup>	0	0	0
New Marlborough	0	8	0	0	0	0
New Salem	0	10	0	1	0	0
Newbury	0	73	-- <sup>1</sup>	0	0	0
Newburyport	726	197	13	9	1	1
Newton	4,262	832	38	6	6	5
Norfolk	0	152	12	1	0	0
North Adams	355	174	15	28	2	1
North Andover	0	345	22	7	2	1
North Attleboro	2	386	28	14	2	0
North Brookfield	0	46	-- <sup>1</sup>	6	0	0
North Reading	0	206	4	0	0	0
Northampton	940	240	21	19	0	0
Northborough	0	193	10	3	2	2
Northbridge	1	227	10	12	0	0
Northfield	0	28	0	1	0	0
Norton	1	253	15	11	2	2
Norwell	0	95	-- <sup>1</sup>	1	0	0
Norwood	997	333	22	8	5	5
Oak Bluffs	129	43	-- <sup>1</sup>	1	0	0

**Table 16A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths,  
Massachusetts Municipalities, 1997**

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Oakham	0	17	-- <sup>1</sup>	2	0	0
Orange	1	98	-- <sup>1</sup>	13	0	0
Orleans	0	28	-- <sup>1</sup>	0	0	0
Otis	0	9	0	0	0	0
Oxford	1	165	10	17	1	1
Palmer	2	134	11	15	1	1
Paxton	0	40	0	2	0	0
Peabody	1	569	31	12	4	2
Pelham	1	12	0	0	0	0
Pembroke	0	296	19	8	3	2
Pepperell	1	150	11	4	0	0
Peru	0	8	-- <sup>1</sup>	0	0	0
Petersham	0	10	-- <sup>1</sup>	0	0	0
Phillipston	1	13	-- <sup>1</sup>	1	0	0
Pittsfield	917	535	47	59	3	3
Plainfield	0	4	0	1	0	0
Plainville	0	95	5	1	0	0
Plymouth	823	677	42	38	4	4
Plympton	0	30	-- <sup>1</sup>	3	0	0
Princeton	0	26	-- <sup>1</sup>	0	0	0
Provincetown	0	17	-- <sup>1</sup>	4	1	0
Quincy	662	1,077	69	38	8	6
Randolph	0	378	30	13	0	0
Raynham	0	142	7	7	1	1
Reading	0	347	19	2	2	2
Rehoboth	1	98	-- <sup>1</sup>	2	0	0
Revere	0	589	46	48	2	1
Richmond	0	12	0	1	0	0
Rochester	0	36	-- <sup>1</sup>	2	0	0
Rockland	0	246	19	11	4	3
Rockport	0	85	9	5	0	0
Rowe	0	6	0	0	0	0
Rowley	0	76	6	4	1	1
Royalston	0	10	0	1	0	0
Russell	0	24	-- <sup>1</sup>	1	0	0
Rutland	1	94	7	1	1	1
Salem	1,733	475	40	35	3	2
Salisbury	0	85	8	9	0	0
Sandisfield	1	8	-- <sup>1</sup>	0	0	0
Sandwich	1	253	12	4	0	0
Saugus	0	276	15	5	0	0
Savoy	0	6	0	1	0	0
Scituate	3	229	13	2	0	0
Seekonk	3	129	7	2	1	1
Sharon	1	238	20	1	0	0

**Table 16A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths, Massachusetts Municipalities, 1997**

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Sheffield	1	42	-- <sup>1</sup>	1	0	0
Shelburne	0	21	-- <sup>1</sup>	2	0	0
Sherborn	0	44	0	1	0	0
Shirley	0	64	-- <sup>1</sup>	7	0	0
Shrewsbury	0	445	30	5	4	4
Shutesbury	1	17	0	0	0	0
Somerset	0	113	11	6	2	1
Somerville	5	925	58	58	1	1
South Hadley	1	157	11	11	0	0
Southampton	0	59	-- <sup>1</sup>	0	0	0
Southborough	0	151	11	3	2	2
Southbridge	441	243	13	48	1	0
Southwick	1	101	5	3	1	1
Spencer	0	133	7	14	0	0
Springfield	5,814	2,327	225	494	23	22
Sterling	2	85	7	2	0	0
Stockbridge	0	7	0	1	0	0
Stoneham	1,254	262	17	5	5	5
Stoughton	0	305	24	23	1	1
Stow	0	90	7	1	0	0
Sturbridge	2	86	-- <sup>1</sup>	5	0	0
Sudbury	0	214	11	3	0	0
Sunderland	2	36	-	2	0	0
Sutton	1	104	7	1	0	0
Swampscott	0	173	13	2	0	0
Swansea	0	145	8	13	1	1
Taunton	705	771	42	70	4	2
Templeton	0	85	5	7	0	0
Tewksbury	1	425	28	9	2	1
Tisbury	1	27	0	2	0	0
Tolland	0	4	0	0	0	0
Topsfield	0	59	-- <sup>1</sup>	0	1	1
Townsend	1	106	8	5	1	1
Truro	0	13	-- <sup>1</sup>	0	0	0
Tyngsborough	1	183	13	9	0	0
Tyringham	0	2	0	0	0	0
Upton	1	120	6	2	2	2
Uxbridge	0	175	10	7	0	0
Wakefield	0	339	15	4	1	0
Wales	0	17	-- <sup>1</sup>	0	0	0
Walpole	0	285	12	4	1	1
Waltham	245	666	33	30	1	1
Ware	194	96	10	13	0	0
Wareham	452	236	13	26	0	0
Warren	0	47	8	7	0	0

**Table 16A. Birth Characteristics: Occurrence and Resident Births and Infant Deaths,  
Massachusetts Municipalities, 1997**

Community	Occurrence Births	Resident Births	Low Birthweight	Teen Births, < 20 years	Infant Deaths	Neonatal Deaths
Warwick	0	9	0	3	0	0
Washington	0	7	0	1	0	0
Watertown	0	378	28	0	1	1
Wayland	0	186	14	1	1	1
Webster	1	200	16	18	0	0
Wellesley	83	327	19	2	1	1
Wellfleet	0	17	0	1	0	0
Wendell	0	8	-- <sup>1</sup>	0	1	0
Wenham	0	29	-- <sup>1</sup>	0	0	0
West Boylston	0	70	-- <sup>1</sup>	4	0	0
West Bridgewater	0	55	-- <sup>1</sup>	3	0	0
West Brookfield	0	37	5	3	0	0
West Newbury	0	54	0	1	0	0
West Springfield	0	324	24	29	3	2
West Stockbridge	1	9	0	0	0	0
West Tisbury	0	23	0	0	0	0
Westborough	1	220	20	3	3	2
Westfield	4	432	22	41	2	1
Westford	0	336	20	4	2	2
Westhampton	1	18	0	0	0	0
Westminster	0	79	7	3	0	0
Weston	0	136	8	0	0	0
Westport	0	142	13	6	2	1
Westwood	0	179	11	2	1	1
Weymouth	3,188	763	64	32	1	1
Whately	1	20	-- <sup>1</sup>	1	0	0
Whitman	0	188	11	7	0	0
Wilbraham	0	99	6	1	0	0
Williamsburg	1	17	0	0	0	0
Williamstown	0	49	6	1	0	0
Wilmington	0	334	23	7	2	2
Winchendon	2	125	13	29	0	0
Winchester	2,039	244	10	4	0	0
Windsor	0	10	0	0	0	0
Winthrop	1	207	11	9	0	0
Woburn	1	483	37	14	1	0
Worcester	6,001	2330	204	320	19	13
Worthington	0	16	0	1	0	0
Wrentham	0	147	13	4	1	0
Yarmouth	0	218	13	21	1	1

<sup>1</sup>Values of 1-4 for medical characteristics of communities with less than 200 births are suppressed based on Guidelines For Release Of Birth Data, Bureau of Health Statistics, Research and Evaluation.

NOTE: There is one occurrence birth with birth city residence code missing.

**Table 16B. Birth Characteristics, Occurrence and Resident Births and Infant Deaths by County, Massachusetts: 1997**

County Name	Occurrence	Resident Births			Deaths	
	Births	Number	Low	Teen	Infant	Neonatal
			Birthweight	(< 20 years)		
<b>STATE TOTAL</b>	81,264	80,321	5,617	5,904	425	323
Barnstable	1,662	2,072	122	142	11	8
Berkshire	1,459	1,351	113	121	9	6
Bristol	4,737	6,485	414	587	32	21
Dukes	134	154	-- <sup>1</sup>	4	0	0
Essex	8,268	9,447	634	790	68	51
Franklin	576	741	30	61	5	2
Hampden	6,283	5,758	465	881	40	33
Hampshire	1,145	1,356	87	94	1	1
Middlesex	18,457	19,275	1,225	789	78	64
Nantucket	75	110	7	1	1	1
Norfolk	4,938	8,340	528	213	34	25
Plymouth	3,549	6,368	440	402	28	23
Suffolk	21,043	9,237	832	990	71	51
Worcester	8,937	9,627	716	829	47	37

<sup>1</sup>Values of 1-4 for medical characteristics of communities with less than 200 births are suppressed based on *Guidelines For Release Of Birth Data*, Bureau of Health Statistics, Research and Evaluation.

NOTE: There is one occurrence birth with birth city residence code missing.

**Table 16C. Birth Characteristics, Occurrence and Resident Births and Infant Deaths, Massachusetts Community Health Network Areas (CHNAs): 1997**

Community Health Network Area	Occurrence Births	Resident Births			Deaths	
		Number	Low Birthweight	Teen (< 20 years)	Infant	Neonatal
<b>STATE TOTAL</b>	81,264	80,321	5,617	5,904	425	323
Community Health Network of Berkshire	1,459	1351	113	121	9	6
Upper Valley Health Web (Franklin County)	577	912	46	82	5	2
Partnership for Health in Hampshire County (Northampton)	1,145	1,328	87	91	1	1
The Community Health Connection (Springfield)	465	1,896	124	304	11	7
Greater Southbridge Community Health Network	5,818	3,798	330	576	29	26
Community Partners for Health (Milford)	445	1,376	91	146	2	1
Community Health Network of Greater Metro West (Framingham)	583	2,327	138	73	6	4
Community Wellness Coalition (Worcester)	2,669	5,363	366	160	30	24
Fitchburg/Gardner Community Health Network	6,003	3,719	302	362	27	20
Greater Lowell Community Health Network	1,909	3,127	215	272	9	7
Greater Lawrence Community Health Network	2,855	4,094	285	332	16	13
Greater Haverhill Community Health Network	2,553	2,635	174	345	24	19
Greater Beverly/Gloucester Community Health Network	1,255	1,954	126	131	10	9
North Shore Community Health Network	2,725	1,379	91	68	5	4
Greater Woburn/Concord/Littleton Community Health Network	1,735	3,479	243	246	29	19
North Suburban Health Alliance (Medford/Malden/Melrose)	3,525	2,655	154	40	7	5
Greater Cambridge/Somerville Community Health Network	3,030	3,465	197	97	19	17
West Suburban Health Network (Newton/Waltham)	1,870	3,208	223	121	8	6
Alliance for Community Health (Boston/Chelsea/Revere/Winthrop)	4,591	2,919	154	55	13	12
Blue Hills Community Health Alliance (Quincy)	21,045	9,836	876	996	72	52
Four (For) Communities (Holyoke)	4,853	4,617	302	133	22	17
Greater Brockton Community Health Network	2,266	3,052	253	276	13	10
South Shore Community Partners in Prevention (Plymouth)	826	2,504	147	103	16	14
Health & Education Response (Attleboro/Taunton)	1,545	3,310	194	172	13	9
Partners for a Healthier Community (Fall River)	1,627	1,509	120	166	11	7
Greater New Bedford Community Health Network	2,018	2,172	133	289	6	3
Cape and Islands Community Health Network	1,871	2,336	133	147	12	9

NOTE: There is one occurrence birth with birth city residence code missing.

## APPENDIX



## TECHNICAL NOTES

### Limitations of small numbers:

Cells in some tables in this publication, and particularly those tables specific to the individual cities and towns, contain small numbers. Rates and proportions based upon less than five observations are suppressed, and trends based upon small numbers should be interpreted cautiously.

### Differences with previously published data

Numbers and rates in this publication may differ slightly from those contained in previous reports because of updates of birth and death certificate files, and the re-estimates of the 1991-1994 and 1997 population using the 1990 US Bureau of the Census' Modified Age, Race and Sex (MARS) file and the 1995 population estimates published by the Massachusetts Institute for Social and Economic Research (MISER) in December 1998.

### Self-reported data

Many items used in this publication, such as number of prenatal care visits, maternal smoking, and type of health insurance coverage, are self-reported, and are subject to the usual limitations of this type of information.

## CHANGES IN THE COLLECTION OF RACE AND ETHNICITY INFORMATION

### Assignment of an Infant's Race/Ethnicity

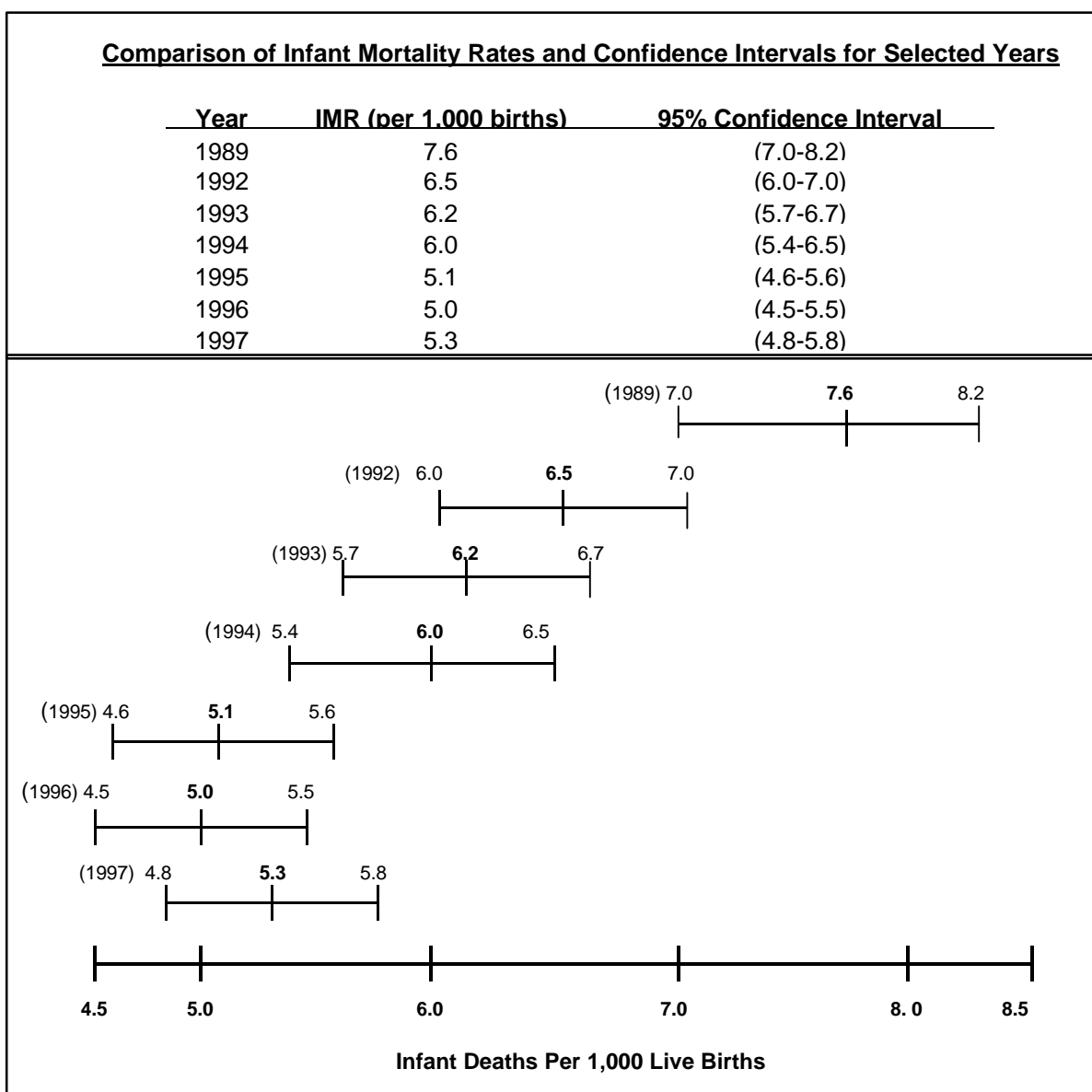
Prior to 1989, the race/ethnicity of an infant was assigned by combining information on the race/ethnicity of the mother and the race/ethnicity of the father. Since 1989, Massachusetts has followed the recommendation of the National Center for Health Statistics of classifying births according to the self-reported race/ethnicity of the mother. Therefore, beginning in 1989, the race/ethnicity of an infant is identical to the self-reported race/ethnicity of the infant's mother.

### Addition of Information on Hispanic Ethnicity

Beginning in 1986, an identifier for Hispanic ethnicity was added to the birth certificate; in 1989, an identifier for Hispanic ethnicity was added to the death certificate. Prior to these changes, most Hispanics were included with whites and it was not possible to accurately calculate Hispanic-specific rates of natality and mortality.

## CONFIDENCE INTERVALS AND INFANT MORTALITY RATES

Beginning in the 1992 Advance Data: Births publication, 95% confidence intervals were added to the calculation of infant mortality rates (IMRs). The confidence interval (CI) provides a measure of stability of the IMR and a basis for comparing rates to determine if they are statistically different. Rates can be compared for the same group in different years, or for different groups in the same year. The width of the CI reflects the stability of the IMR. For example, a narrow CI reflects high stability, and a wide interval reflects low stability. If the CIs around two IMRs being compared do not overlap, the difference between the two rates is statistically significant. The following table and chart illustrate the concept of statistically significant differences using actual data from 1989 and 1992-1997.



The difference between the 1993 IMR and 1996 IMR is statistically significant -- the confidence intervals do not overlap. The same is true for the differences between the 1989 IMR and the annual IMRs for 1993, 1994, 1995, 1996, and 1997.

**95% Confidence Intervals for Infant Mortality Rates, by Race and Hispanic Ethnicity, Massachusetts; 1990-1997**

Year	Total <sup>1</sup>		White non-Hispanic		Black non-Hispanic		Hispanic		Asian	
	#	Rate <sup>2</sup> (C.I).	#	Rate <sup>2</sup> (C.I).	#	Rate <sup>2</sup> (C.I).	#	Rate <sup>2</sup> (C.I).	#	Rate <sup>2</sup> (C.I).
1990	649	<b>7.0</b> (6.5, 7.5)	442	<b>6.1</b> (5.5, 6.7)	98	<b>13.7</b> (11.0, 16.4)	77	<b>9.1</b> (7.1, 11.1)	24	<b>7.0</b> (4.2, 10.0)
1991	577	<b>6.5</b> (6.0, 7.0)	381	<b>5.5</b> (4.9, 6.1)	101	<b>15.0</b> (12.1, 17.9)	80	<b>9.4</b> (7.3, 11.5)	14	<b>4.2</b> (2.0, 6.4)
1992	569	<b>6.5</b> (6.0, 7.0)	371	<b>5.5</b> (4.9, 6.1)	110	<b>16.4</b> (13.4, 19.4)	67	<b>7.9</b> (6.0, 9.8)	16	<b>4.9</b> (2.5, 7.3)
1993	523	<b>6.2</b> (5.7, 6.7)	346	<b>5.3</b> (4.7, 5.9)	84	<b>13.1</b> (10.3, 15.9)	77	<b>9.3</b> (7.2, 11.4)	13	<b>3.9</b> (1.8, 6.0)
1994	499	<b>6.0</b> (5.4, 6.5)	343	<b>5.3</b> (4.7, 5.9)	79	<b>12.6</b> (9.8, 15.4)	64	<b>7.6</b> (5.7, 9.4)	8	<b>2.4</b> (0.7, 4.0)
1995	419	<b>5.1</b> (4.6, 5.6)	275	<b>4.4</b> (3.8, 4.9)	65	<b>11.1</b> (8.4, 13.8)	58	<b>7.2</b> (5.3, 9.0)	19	<b>5.5</b> (3.0, 8.0)
1996	403	<b>5.0</b> (4.5, 5.5)	289	<b>4.7</b> (4.1, 5.2)	63	<b>11.4</b> (8.6, 14.2)	40	<b>5.1</b> (3.5, 6.7)	8	<b>2.2</b> (0.7, 3.7)
1997	425	<b>5.3</b> (4.8, 5.8)	294	<b>4.8</b> (4.2, 5.3)	64	<b>11.7</b> (8.8, 14.3)	55	<b>6.7</b> (4.9, 8.4)	10	<b>2.6</b> (1.0, 4.2)

<sup>1</sup>Deaths of infants of unknown race are excluded except for the total calculation. For rate computations, births of infants of unknown race are allocated into the race categories according to the distribution of births of known race.

<sup>2</sup>Rates are expressed per 1,000 live births.

In 1997, the black non-Hispanic infant mortality rate was 11.7 deaths per 1,000 live births (95% CI: 8.8,14.3), which was 2.4 times greater than the white non-Hispanic infant mortality rate of 4.8 (95% CI: 4.2, 5.3). The difference in these two rates was statistically significant. The rate of infant mortality for black non-Hispanics was also significantly elevated compared to Hispanics and Asians in 1997.

## DEFINITION OF RATES

### Age-Specific Birth Rate

The number of children born to women in a specific age group divided by the population of women in that specific age group, multiplied by 1,000.

### Birth Rate

Births per 1,000 population.

$$\text{Birth rate} = \frac{\text{Number of resident live births}}{\text{Total resident population}} \times 1,000$$

### Cesarean Section Rates

$$\text{Total C-section rate} = \frac{\text{Number of C-section births}}{\text{Number of occurrence births}} \times 100$$

$$\text{Primary C-section rate} = \frac{\text{Number of primary C-section births}}{[\text{Number of occurrence births} - (\text{number of repeat C-section births} + \text{VBACs})]} \times 100$$

$$\text{Repeat C-section rate} = \frac{\text{Number of repeat C-section births}}{(\text{Number of repeat C-section births} + \text{number of VBACs})} \times 100$$

$$\text{VBAC rate} = \frac{\text{Number of VBACs}}{(\text{Number of repeat C-section births} + \text{number of VBACs})} \times 100$$

NOTE: the rates presented in Table 16 are for occurrence births but can be calculated for residence births as well.

### Crude Birth Rate

The number of births in a year divided by the population, multiplied by 1,000.

### General Fertility Ratio

See Age-Specific Birth Rate.

### Infant Mortality Rate (IMR)

The death rate among infants less than one year old, per 1,000 live births.

$$\text{Infant Mortality Rate} = \frac{\text{Number of resident deaths in a year of infants less than one year old}}{\text{Number of resident live births in the same year}} \times 1,000$$

### Neonatal Mortality Rate (NMR)

The death rate among infants under 28 days of age, per 1,000 live births.

$$\text{Neonatal Mortality Rate} = \frac{\text{Number of resident deaths in a year of infants less than 28 days of age}}{\text{Number of resident live births in the same year}} \times 1,000$$

### Post Neonatal Mortality Rate

The death rate among infants 28 days of age to less than one year old, per 1,000 live births.

$$\text{Post Neonatal Mortality Rate} = \frac{\text{Number of resident deaths in a year of infants 28 days of age to less than one year of age}}{\text{Number of resident live births in the same year}} \times 1,000$$

### Total Rate of Change

The total rate of change is calculated as follows:

$$\frac{P_n - P_o}{P_o} \times 100$$

where

$P_n$  = rate during later time period

$P_o$  = rate during earlier time period

## DEFINITION OF COMMUNITY HEALTH NETWORK AREAS

The Department of Public Health, in collaboration with health service providers, coalition members, and interested citizens, has designated 27 areas for community health planning. It is the Department's intention to foster in each of these areas the development of Community Health Networks -- consortia of health care providers, human service agencies, schools, churches, youth, parents, elders, advocacy groups, and individual consumers -- to address the health needs of the community. These community coalitions will participate in monitoring outcomes and progress of strategies and responses to those health needs.

It is hoped the Networks will mobilize around key health issues impacting the community, promote prevention efforts, enhance access to care, provide opportunities for more collaboration among agencies, and create a client-centered, outcome-oriented health service delivery system. Community Health Networks will also promote efficiency in service delivery by working to reduce duplication and overlap, and by identifying gaps, in service.

A Community Health Network Area (CHNA) is defined as an aggregation of cities and towns. (The city of Boston constitutes its own Community Health Network area). In the current publication, we have presented some data by CHNA. To determine which cities and towns make up a particular CHNA, the table on pages 89-91 provides the appropriate CHNA code for each city and town.

**The data published in this volume reflect the new definitions of CHNAs instituted in January 1997 and the new CHNA names.**

### Massachusetts Cities, Counties, and Community Health Networks (CHNAs): 1997

City/Town	County	CHNA	City/Town	County	CHNA
Abington	Plymouth	22	Concord	Middlesex	15
Acton	Middlesex	15	Conway	Franklin	2
Acushnet	Bristol	26	Cummington	Hampshire	3
Adams	Berkshire	1	Dalton	Berkshire	1
Agawam	Hampden	4	Danvers	Essex	14
Alford	Berkshire	1	Dartmouth	Bristol	26
Amesbury	Essex	12	Dedham	Norfolk	18
Amherst	Hampshire	3	Deerfield	Franklin	2
Andover	Essex	11	Dennis	Barnstable	27
Arlington	Middlesex	17	Dighton	Bristol	24
Ashburnham	Worcester	9	Douglas	Worcester	6
Ashby	Middlesex	9	Dover	Norfolk	18
Ashfield	Franklin	2	Dracut	Middlesex	10
Ashland	Middlesex	7	Dudley	Worcester	5
Athol	Worcester	2	Dunstable	Middlesex	10
Attleboro	Bristol	24	Duxbury	Plymouth	23
Auburn	Worcester	8	East Bridgewater	Plymouth	22
Avon	Norfolk	22	East Brookfield	Worcester	5
Ayer	Middlesex	9	East Longmeadow	Hampden	4
Barnstable	Barnstable	27	Eastham	Barnstable	27
Barre	Worcester	9	Easthampton	Hampshire	3
Becket	Berkshire	1	Easton	Bristol	22
Bedford	Middlesex	15	Edgartown	Dukes	27
Belchertown	Hampshire	3	Egremont	Berkshire	1
Bellingham	Norfolk	6	Erving	Franklin	2
Belmont	Middlesex	17	Essex	Essex	13
Berkley	Bristol	24	Everett	Middlesex	16
Berlin	Worcester	9	Fairhaven	Bristol	26
Bernardston	Franklin	2	Fall River	Bristol	25
Beverly	Essex	13	Falmouth	Barnstable	27
Billerica	Middlesex	10	Fitchburg	Worcester	9
Blackstone	Worcester	6	Florida	Berkshire	1
Blandford	Hampden	4	Foxborough	Norfolk	7
Bolton	Worcester	9	Frammingham	Middlesex	7
Boston	Suffolk	19	Franklin	Norfolk	6
Bourne	Barnstable	27	Freetown	Bristol	26
Boxborough	Middlesex	15	Gardner	Worcester	9
Boxford	Essex	12	Gay Head	Dukes	27
Boylston	Worcester	8	Georgetown	Essex	12
Braintree	Norfolk	20	Gill	Franklin	2
Brewster	Barnstable	27	Gloucester	Essex	13
Bridgewater	Plymouth	22	Goshen	Hampshire	3
Brimfield	Hampden	5	Gosnold	Dukes	27
Brockton	Plymouth	22	Grafton	Worcester	8
Brookfield	Worcester	5	Granby	Hampshire	3
Brookline	Norfolk	19	Granville	Hampden	4
Buckland	Franklin	2	Great Barrington	Berkshire	1
Burlington	Middlesex	15	Greenfield	Franklin	2
Cambridge	Middlesex	17	Groton	Middlesex	9
Canton	Norfolk	20	Groveland	Essex	12
Carlisle	Middlesex	15	Hadley	Hampshire	3
Carver	Plymouth	23	Halifax	Plymouth	23
Charlemont	Franklin	2	Hamilton	Essex	13
Charlton	Worcester	5	Hampden	Hampden	4
Chatham	Barnstable	27	Hancock	Berkshire	1
Chelmsford	Middlesex	10	Hanover	Plymouth	23
Chelsea	Suffolk	19	Hanson	Plymouth	23
Cheshire	Berkshire	1	Hardwick	Worcester	9
Chester	Hampden	21	Harvard	Worcester	9
Chesterfield	Hampshire	3	Harwich	Barnstable	27
Chicopee	Hampden	21	Hatfield	Hampshire	3
Chilmark	Dukes	27	Haverhill	Essex	12
Clarksburg	Berkshire	1	Hawley	Franklin	2
Clinton	Worcester	9	Heath	Franklin	2
Cohasset	Norfolk	20	Hingham	Plymouth	20
Colrain	Franklin	2	Hinsdale	Berkshire	1

City/Town	County	CHNA	City/Town	County	CHNA
Holbrook	Norfolk	22	New Bedford	Bristol	26
Holden	Worcester	8	New Braintree	Worcester	9
Holland	Hampden	5	New Marlborough	Berkshire	1
Holliston	Middlesex	7	New Salem	Franklin	2
Holyoke	Hampden	21	Newbury	Essex	12
Hopedale	Worcester	6	Newburyport	Essex	12
Hopkinton	Middlesex	7	Newton	Middlesex	18
Hubbardston	Worcester	9	Norfolk	Norfolk	7
Hudson	Middlesex	7	North Adams	Berkshire	1
Hull	Plymouth	20	North Andover	Essex	11
Huntington	Hampshire	21	North Attleboro	Bristol	24
Ipswich	Essex	13	North Brookfield	Worcester	5
Kingston	Plymouth	23	North Reading	Middlesex	16
Lakeville	Plymouth	24	Northampton	Hampshire	3
Lancaster	Worcester	9	Northborough	Worcester	7
Lanesborough	Berkshire	1	Northbridge	Worcester	6
Lawrence	Essex	11	Northfield	Franklin	2
Lee	Berkshire	1	Norton	Bristol	24
Leicester	Worcester	8	Norwell	Plymouth	20
Lenox	Berkshire	1	Norwood	Norfolk	20
Leominster	Worcester	9	Oak Bluffs	Dukes	27
Leverett	Franklin	2	Oakham	Worcester	9
Lexington	Middlesex	15	Orange	Franklin	2
Leyden	Franklin	2	Orleans	Barnstable	27
Lincoln	Middlesex	15	Otis	Berkshire	1
Littleton	Middlesex	15	Oxford	Worcester	5
Longmeadow	Hampden	4	Palmer	Hampden	4
Lowell	Middlesex	10	Paxton	Worcester	8
Ludlow	Hampden	21	Peabody	Essex	14
Lunenburg	Worcester	9	Pelham	Hampshire	3
Lynn	Essex	14	Pembroke	Plymouth	23
Lynnfield	Essex	14	Pepperell	Middlesex	9
Malden	Middlesex	16	Peru	Berkshire	1
Manchester	Essex	13	Petersham	Worcester	2
Mansfield	Bristol	24	Phillipston	Worcester	2
Marblehead	Essex	14	Pittsfield	Berkshire	1
Marion	Plymouth	26	Plainfield	Hampshire	3
Marlborough	Middlesex	7	Plainville	Norfolk	7
Marshfield	Plymouth	23	Plymouth	Plymouth	23
Mashpee	Barnstable	27	Plympton	Plymouth	23
Mattapoisett	Plymouth	26	Princeton	Worcester	9
Maynard	Middlesex	7	Provincetown	Barnstable	27
Medfield	Norfolk	7	Quincy	Norfolk	20
Medford	Middlesex	16	Randolph	Norfolk	20
Medway	Norfolk	6	Raynham	Bristol	24
Melrose	Middlesex	16	Reading	Middlesex	16
Mendon	Worcester	6	Rehoboth	Bristol	24
Merrimac	Essex	12	Revere	Suffolk	19
Methuen	Essex	11	Richmond	Berkshire	1
Middleborough	Plymouth	24	Rochester	Plymouth	26
Middlefield	Hampshire	3	Rockland	Plymouth	23
Middleton	Essex	11	Rockport	Essex	13
Milford	Worcester	6	Rowe	Franklin	2
Millbury	Worcester	8	Rowley	Essex	12
Millis	Norfolk	7	Royalston	Worcester	2
Millville	Worcester	6	Russell	Hampden	4
Milton	Norfolk	20	Rutland	Worcester	9
Monroe	Franklin	2	Salem	Essex	14
Monson	Hampden	4	Salisbury	Essex	12
Montague	Franklin	2	Sandisfield	Berkshire	1
Monterey	Berkshire	1	Sandwich	Barnstable	27
Montgomery	Hampden	4	Saugus	Essex	14
Mount Washington	Berkshire	1	Savoy	Berkshire	1
Nahant	Essex	14	Scituate	Plymouth	20
Nantucket	Nantucket	27	Seekonk	Bristol	24
Natick	Middlesex	7	Sharon	Norfolk	20
Needham	Norfolk	18	Sheffield	Berkshire	1
New Ashford	Berkshire	1	Shelburne	Franklin	2

City/Town	County	CHNA	City/Town	County	CHNA
Sherborn	Middlesex	7	Westford	Middlesex	10
Shirley	Middlesex	9	Westhampton	Hampshire	3
Shrewsbury	Worcester	8	Westminster	Worcester	9
Shutesbury	Franklin	2	Weston	Middlesex	18
Somerset	Bristol	25	Westport	Bristol	25
Somerville	Middlesex	17	Westwood	Norfolk	18
South Hadley	Hampshire	3	Weymouth	Norfolk	20
Southampton	Hampshire	3	Whately	Franklin	2
Southborough	Worcester	7	Whitman	Plymouth	22
Southbridge	Worcester	5	Wilbraham	Hampden	4
Southwick	Hampden	4	Williamsburg	Hampshire	3
Spencer	Worcester	5	Williamstown	Berkshire	1
Springfield	Hampden	4	Wilmington	Middlesex	15
Sterling	Worcester	9	Winchendon	Worcester	9
Stockbridge	Berkshire	1	Winchester	Middlesex	15
Stoneham	Middlesex	16	Windsor	Berkshire	1
Stoughton	Norfolk	22	Winthrop	Suffolk	19
Stow	Middlesex	7	Woburn	Middlesex	15
Sturbridge	Worcester	5	Worcester	Worcester	8
Sudbury	Middlesex	7	Worthington	Hampshire	3
Sunderland	Franklin	2	Wrentham	Norfolk	7
Sutton	Worcester	6	Yarmouth	Barnstable	27
Swampscott	Essex	14			
Swansea	Bristol	25			
Taunton	Bristol	24			
Templeton	Worcester	9			
Tewksbury	Middlesex	10			
Tisbury	Dukes	27			
Tolland	Hampden	4			
Topsfield	Essex	13			
Townsend	Middlesex	9			
Truro	Barnstable	27			
Tyngsborough	Middlesex	10			
Tyringham	Berkshire	1			
Upton	Worcester	6			
Uxbridge	Worcester	6			
Wakefield	Middlesex	16			
Wales	Hampden	5			
Walpole	Norfolk	7			
Waltham	Middlesex	18			
Ware	Hampshire	3			
Wareham	Plymouth	26			
Warren	Worcester	5			
Warwick	Franklin	2			
Washington	Berkshire	1			
Watertown	Middlesex	17			
Wayland	Middlesex	7			
Webster	Worcester	5			
Wellesley	Norfolk	18			
Wellfleet	Barnstable	27			
Wendell	Franklin	2			
Wenham	Essex	13			
West Boylston	Worcester	8			
West Bridgewater	Plymouth	22			
West Brookfield	Worcester	5			
West Newbury	Essex	12			
West Springfield	Hampden	4			
West Stockbridge	Berkshire	1			
West Tisbury	Dukes	27			
Westborough	Worcester	7			
Westfield	Hampden	21			



## GLOSSARY

### Adequacy of Prenatal Care

The Index of Adequacy of Prenatal Care (based on the Kessner Index) has five categories (adequate, intermediate, inadequate, no prenatal care, and unknown), based on the trimester in which prenatal care began and the number of prenatal visits. The general classification scheme for full-term infants is as follows:

Category	Trimester Care Began	Number of Visits
Adequate	1	9 or more
Intermediate	1	5-8
	2	5 or more
	1	1-4
Inadequate	2	1-4
	3	1 or more
No prenatal care	--	0
Unknown	unknown	unknown

This classification is adjusted for gestational age to allow for proper classification of premature births.

### Birthweight

The weight of an infant recorded at the time of delivery. It may be recorded in either pounds/ounces or grams. If recorded in pounds/ounces, it is converted to grams for use in this report.

1 pound = 453.6 grams

1,000 grams = 2 pounds and 3 ounces

### Birthweight Categories

Normal birthweight (NBW): An infant's weight of 2,500 grams ( approximately 5.5 pounds) or more recorded at birth.

Low birthweight (LBW): An infant's weight of less than 2,500 grams (5.5 pounds) recorded at birth.

Very low birthweight (VLBW): An infant's weight of less than 1,500 grams (3.3 pounds) recorded at birth.

### Cesarean Section or C-Section

Primary: A mother's first Cesarean section delivery.

Repeat: A Cesarean delivery that has been preceded by at least one Cesarean delivery.

### Confidence Intervals

The confidence interval (CI) for the infant mortality rate (IMR) is a range of values that has a 95% chance of including the underlying risk of an infant death. Observed rates are subject to statistical variation; even if the underlying risk of infant death is identical in two subpopulations, the observed IMRs for the subpopulations may differ because of random variation. The

confidence interval describes the precision of observed IMR as an estimate of the underlying risk of infant death, with a wider interval indicating less certainty about this estimate. The width of the interval reflects the size of the subpopulation and the number of infant deaths; smaller subpopulations with fewer infant deaths lead to wider confidence intervals.

#### Ethnicity

See the section in the Appendix entitled: Changes in the Collection of Race and Ethnicity Information.

#### Foreign-Born Women

Women not born in the United States, its possessions or protectorates. Women born in Puerto Rico, the US Virgin Islands, and Guam are not foreign-born.

#### Gravidity

The number of pregnancies experienced by a woman.

#### Healthy Start

A Massachusetts-funded program providing services and financing for prenatal care to low-income pregnant women who lack health insurance, but do not qualify for Medicaid.

#### ICD-9

ICD is the abbreviation for the International Classification of Diseases. The ICD classifies mortality information for statistical purposes. The ICD was first used in 1900, and has since been revised about every 10 years. The Ninth Revision, published in 1977, is used to code mortality data beginning in 1979.

#### Infant

A child whose age is less than one year (365 days).

#### Infant Death

Death of a child whose age is less than one year.

#### Live Birth

A live birth is any infant who breathes or shows any other evidence of life (such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles) after separation from the mother's uterus, regardless of the duration of gestation.

#### Low Birthweight (LBW)

See Birthweight Categories.

#### Neonatal

Infants under 28 days of age.

#### Neonatal Death

Death of a child whose age is less than 28 days.

#### Occurrence Birth

A birth occurring in the Commonwealth of Massachusetts, regardless of the residency of the mother. For individual cities/towns, an occurrence birth represents any birth occurring in that city/town, regardless of the residence of the mother. See Resident Birth.

#### Parity

The total number of live infants ever born to a woman, including the current birth.

Plurality

The number of births to a woman produced in the same gestational period. A singleton is the birth of one infant, twins represent the births of two infants, etc.

Post Neonatal

A child whose age is at least 28 days, but less than one year.

Post Neonatal Death

Death of a child whose age is at least 28 days, but less than one year.

Race

See the section in the Appendix entitled: Changes in the Collection of Race and Ethnicity Information.

Resident Birth

The birth of an infant whose mother reports her usual place of residence is in Massachusetts. In Massachusetts, a resident is a person with a permanent address in one of the 351 cities or towns. Vital statistics data may be presented in terms either of residence or occurrence. All data in this publication, except the data in Table 13, are resident data. Resident data include all events that occur to residents of the Commonwealth, wherever they occur. Occurrence data include all events that occur within the state, whether to residents or nonresidents. There is an exchange agreement among the 50 states, District of Columbia, Puerto Rico, Virgin Islands, Guam, and Canada that provides for exchange of copies of birth and death records. These records are used for statistical purposes only, and allow each state or province to track the births and deaths of its residents.

Vaginal Birth After Cesarean (VBAC)

A vaginal delivery of an infant to a mother who has had at least one prior Cesarean section delivery.

Very Low Birthweight (VLBW)

See Birthweight Categories.



## Massachusetts Birth Certificate: 1997



*Advance Data: Births 1997* Evaluation Form

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